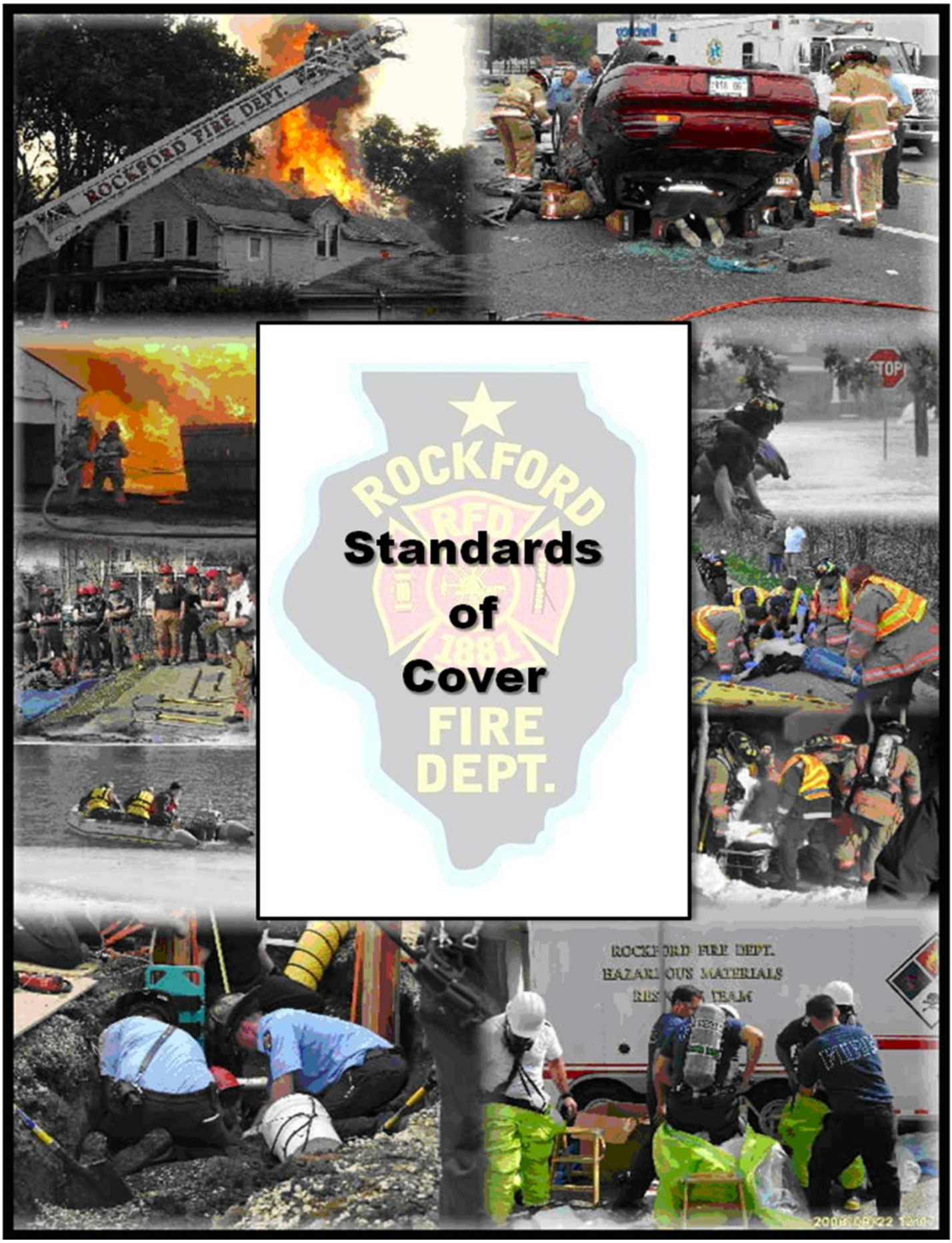
ROCKFORD FIRE DEPT.
ROCKFORD
RFD
1881
FIRE
DEPT.
Standards
of
Cover
ROCKFORD FIRE DEPT.
HAZARDOUS MATERIALS

Fire Fighter

The alarm came in at Two-0-Eight, A house on fire at 12th and State
With covers back and bunkers found, They slid the brass pole to the ground

The cold air swirled thru op'ning doors, The dome lights flashed and siren roared
They donned their gear as rigs propelled, Them, quickly, to a piece of Hell

Now wide awake, they saw the glow, Two blocks away "We've got a go!"
A screeching stop and hose was laid, Next engine in the hydrant made

The "Truckies" swiftly took the door, And hose was drug to second floor
The smoke so thick that flashlight's beam, Three feet away, could not be seen

They felt their way on hands and knees, As others worked to give them ease
By breaking windows- their intent, To give the heat and smoke a vent

With search and rescue under way, The fire was found and hit with spray
A muffled voice within the gloom, Yelled "Children in the northwest room!"

The hissing air tanks picked up speed, They knew danger and the need
To quickly find and give new breath, To victims in the grip of Death

They found them lying on a bed, And 'tho they tried, the kids were dead
The fire was out, but Death had won, He'd claimed a daughter and a son

The blackened men in silence do, The overhaul, and when it's through
And tanks are changed and hose is rolled, Return to quarters, tired and cold

The tools are cleaned and hose restacked, The rig wiped down from front to back
A cigarette and coffee cup, Half-hearted efforts to wash up

The stairs climbed to his waiting bed, A man sits down and bows his head
The tears come slowly to his eyes, And silently this brave man cries

He knows he cannot save them all, But pain's the greatest when they're small
He does his job the best he can, He's not a Hero, just a Man.

Jack C. Kerlin (Deceased)
Rockford Fire Department 1976-1994

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Introduction

The following report serves as the Rockford Fire Department "Integrated Risk Management Plan: Standards of Cover" document. The Commission of Fire Accreditation International describes the Standards of Cover as policies and procedures which are internally developed and based on an agency's system-wide performance, specifically related to distribution and concentration of resources. The purpose of completing this document is to support an agency in the safe, effective and efficient delivery of services in the areas of fire suppression, emergency medical and specialty response.

The Standards of Cover is a research-based process, which requires a comprehensive analysis of an agency's current deployment of services. The document begins with an overview of the jurisdiction and community expectations, and then progresses into an extensive community risk assessment, followed by a three-year reliability study. The results of the study assist the agency in developing realistic and achievable service objectives.

Once service objectives have been adopted, the agency designs a compliance methodology to allow for planning based on recognized weaknesses. The final component of the Standards of Cover provides the organization with an overall assessment of system capabilities. The agency then develops recommendations based on verifiable and validated science for system improvement, designed to achieve community-identified service expectations and industry standards.

Acknowledgements

Division Chief James L. Strey
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Executive Summary

The Standards of Cover for the City of Rockford Fire Department is identified in the following document. The Commission of Fire Accreditation International (CFAI) explains the Standards of Cover as policies which are internally developed and based on an agency's systematic performance, specifically related to distribution and concentration of resources. The Department's response plan is based upon comprehensive risk scoring which includes an extensive risk assessment of occupancies in combination with incident frequency, occupancy density, fire density and response travel times.

Available resources have been allocated based on an attempt to equally distribute coverage throughout the jurisdiction, as well as by providing redundancy of coverage to high incident frequency areas. Travel time catchment maps were developed based on the National Fire Protection Association (NFPA) 1710 industry standard travel time benchmark to identify areas of noncompliance. Individual station still territory maps were analyzed to more thoroughly evaluate noncompliance. Service zone performance gap maps were created to take an even narrower look at the Department's level of service delivery.

The Department conducted a three-year reliability study of its current emergency service capabilities and performance. Although the Department currently provides effective services to the community, opportunities for improvement have also been identified. Travel times have been analyzed for both first arrival and effective response force for all types of emergency incidents. This analysis has revealed the Department's compliance with the CFAI credible travel timeframes for most of the years analyzed in the reliability study, but also leaves considerable room for improvement to align with NFPA 1710 travel times.

Based on capabilities, critical tasking, and historical performance - the Department has developed response performance objectives as part of this Standards of Cover. These time sensitive objectives were designed to provide realistic expectations for each type of service provided by the Department.

A decision matrix incorporating incident frequency, apparatus utilization, and unit availability has been developed and made accessible to Department personnel through the SharePoint website. Action triggers and potential solutions are included to facilitate planning for future service deployment.

The ultimate goal of the Standards of Cover is to develop credible and realistic recommendations for improvement. The recommendations included have been designed to address various noncompliant areas of the jurisdiction in a fiscally responsible way in an effort to better protect the lives and property of its customers.

Section One: Description of Current Deployment

Community Served

The City of Rockford, county seat of Winnebago County, is located in north central Illinois approximately 70 miles northwest of Chicago. According to the 2000 United States Census Bureau, Rockford is the largest city in the area with a population of 150,115. Rockford and the surrounding towns (Belvidere, Cherry Valley, Loves Park, Machesney Park, New Milford, Rockton, Roscoe, South Beloit and Winnebago) are referred to as the Greater Rockford area and have a total population of 339,178.

Government structure

Governed by a mayor/council form of government, the mayor and fourteen council members act as the legislative and policymaking body of the municipality. The City council, comprised of one alderman from each of 14 wards, is elected to a four-year term with all terms expiring concurrently. Although our mayor does not have veto power, he may cast a tie-breaking vote. Legislation is processed through several standing committees, each of which is comprised of aldermen appointed by the Mayor. Committee members meet weekly and discuss items before the committee, vote on these items, and make recommendations for action to the council body. The City council and mayor collectively meet once a week to act on business forwarded from the respective committees to include policies, ordinances, and appropriation of funds that best serves the interest of their respective constituents and the City of Rockford as a whole.

History of milestones

The Rockford Fire Department was formally created, by Code of Ordinances for City of Rockford, section 9-1, November 19, 1855, as a volunteer organization, The City was given the authority by Illinois Municipal Code, 65 Illinois Compiled Statutes (ILCS) 5/11-6-1. The first fire company, Winnebago Company No. 1, was established in May 1856 on the east side of the Rock River in the 100 block of South First Street. A month later the west side became equally represented by Washington Company No. 2, located on North Main Street just off of State Street. The first paid firefighters were hired in May 1881 and consisted of a Fire Chief and five firefighters equipped with steam-powered, horse-drawn apparatus. The Department did not receive its first motorized fire apparatus until 1911, but was fully motorized by 1918.

In an effort to remove the politics from the fire and police departments, the City Council established a Board of Fire Engineers in 1901. Pursuant to the Illinois Municipal Code, 65 ILCS 5/10-2.1-1 through 10-2.1-3 and the Constitution of the State of Illinois (Article VII, Section 6), the City of Rockford established the first Board of Fire and Police Commissioners in the State of Illinois in 1903. The Board's primary functions were to hold all entrance and promotional examinations in accordance with local, state and federal law.

As the City expanded in both area and population, so too, did the number of fire stations and personnel. By 1908 the Department had grown to six fire stations and 42 firefighters. Personnel numbers doubled in 1920 when the Department instituted a two-platoon system. The two-platoon system represented the duty hours worked by personnel. Each platoon consisted of a 24-hour work shift with the next 24 hours spent off duty. Over the next 38 years, personnel numbers increased only incrementally.

The appointment of Chief Wayne E. Swanson in 1947 brought a new administration to the Department. During Chief Swanson's administration the Department had its first documented rating by an outside agency. The National Board of Fire Underwriters classified the Department as a Class IV. However, records do not indicate the exact meaning of a Class IV. The National Board of Fire Underwriters was the precursor to the present day Insurance Services Office (ISO).

Along with the change in leadership, new equipment was added to modernize the post-war department. Carbon dioxide extinguishers, oxygen-producing breathing apparatus, and radio dispatch and communication equipment were introduced to improve the Department's capabilities as the firefighter strength reached 99 personnel. The Department staffing remained generally stable through the early 1950's, until the Department implemented the hours reduction mandated by Illinois State legislature in 1958. Firefighters would now work a 56-hours work week which eventually evolved into a three-platoon system. The new three-platoon schedule involved a 24-hour shift with 48 hours spent off duty. The three-platoon system, now simply referred to as three shifts, remains in effect to the present day.

Not only did the Department dramatically expand personnel in the mid 1950's, additional advancements included a third aerial apparatus, a rescue squad, a fire prevention bureau, and a 25-year lease to provide services for the local airport. By 1958 the Department had expanded to ten fire stations located throughout the city housing 159 personnel.

In addition to the increase in apparatus, personnel and services, 1960 was a pivotal year regarding the safety of firefighters as the rescue squad members were provided with self-contained breathing apparatus (SCBA). It would be another 15 years before SCBA were provided for all front line personnel. As the Department continued to expand services to its citizens, a cardiopulmonary resuscitation (CPR) program was announced in 1961. Members of the rescue squad were trained to deliver CPR. Over the years this program was expanded to include first responders that provided CPR and basic first aid. In the mid 1960's as the city continued to sprawl eastward, the bordering Rock River Fire Protection District was absorbed by the Department. This later led to the construction of an eleventh fire station on the City's southeast side.

The 1970's brought major changes to the Rockford Fire Department. Three quint apparatus were purchased and put into service replacing four separate companies. The rescue squad again expanded its capabilities, when members were trained in the use of specialized heavy rescue equipment allowing the squad to perform extrication. During this time the Department

also assumed boat operations from the Rockford Police Department. Because the Rock River had been divided by a dam, the original boat was restricted to operations above the dam.

By the 1970's the Department was aligned with the Office of the State Fire Marshal's (OSFM) personnel certification programs. The Department also began a structured fire training academy to train both new and incumbent personnel, which was originally housed at the airport fire station. With partial grant funding, the Department constructed the Wayne E. Swanson Training Academy which became the permanent location for the fire training academy and also provided a new location for Fire Station 6.

The Fire Department would again experience a monumental change in service delivery in 1977 when it finally assumed the ambulance service from the police department. Initially two ambulances, Charlie's 27 and 28, were put into service and staffed with emergency medical technicians (EMT), while the Department expanded its training to the paramedic level. Assumption of the ambulance service increased staffing to 207 personnel. By 1978 the Department had five paramedics on duty at any given time, and by 1981 the number of paramedics had increased to 28.

In an effort to improve safety, efficiency and incident control, the Department began to train personnel in the use of the Incident Command System (ICS). By 1979 the Department implemented incident command as part of the standard operating procedures for response to all incidents. By 1980 the Department entered into a Mutual Aid Box Alarm System (MABAS) agreement with the surrounding and regional communities. The primary purpose of MABAS is to coordinate the effective and efficient provision of mutual aid during emergencies, natural disasters, or man-made catastrophes. When a community exhausts its resources, MABAS can be activated by the stricken community, and through a systematic plan, receive immediate assistance of personnel and equipment at the scene of an emergency or disaster. The response may include the following: firefighters, emergency medical services, hazardous materials, divers, access to specialized equipment, etc. Due to the Department's size coupled with the its involvement in MABAS, the Rockford Fire Department continued to emerge as an island in northern Illinois that smaller surrounding communities depended upon for mutual aid assistance, primarily in specialty team response.

After receiving a grant in 1980 to purchase hazardous materials equipment, the rescue squad assumed hazardous materials response duties. By the early eighties, economic conditions required the elimination of the rescue squad and thus the redistribution and reduction in personnel. Because the rescue squad was eliminated, the Department assigned extrication responsibilities to two separate engine companies, one of which also assumed hazardous materials duties. The apparatus previously used for the rescue squad then became the designated hazardous materials response vehicle. Due to the cancellation of the airport lease, the closing of an inner city station and eastward expansion, the Department relocated two stations to the northeast and southeast quadrants of the City in 1981.

The dive team was developed in 1981 after two children drowned in the Rock River. Prior to 1981, firefighters volunteered their time to dive through Rockford Firefighters Local 413 in

conjunction with the Winnebago County Dive Team. The Department's Training Academy received OSFM Unlimited Facility Approval in the early eighties, which expanded the ability to provide professional certifications to personnel. The approval, combined with the internal pool of instructors, provides the opportunity to specify, schedule and teach OSFM certification courses which meet identified needs and can be completed in a more fiscally responsible manner. This also provided the Department with representation on several ad hoc committees responsible for developing training programs for the State of Illinois.

The eighties also brought about drastic change in the Department's tactics and personal protective equipment. The driving force behind theses changes was when two firefighters were severely injured as they fell through a roof at a residential fire while performing vertical ventilation. The majority of the injuries sustained were to the head and lower extremities. At the time of the accident, the Department's personal protective equipment did not include Nomex hoods or require bunker pants at all times. Soon after the incident Nomex hoods were provided for all personnel, the use of bunker pants became a mandatory part of personal protective gear, and the use of vertical ventilation became all but nonexistent. The Department began to research alternate methods of ventilation, and after several years adopted positive pressure ventilation as part of our standard fireground tactics.

By the mid eighties the Department expanded water rescue capabilities by adding a second boat for operations below the dam and smaller bodies of water. Additionally, the Department replaced the boat previously used for operations above the dam with a custom-designed boat. In 1986 the Department also added a third ambulance in response to the increase in EMS incidents.

Due to continued eastward expansion, the Department relocated three stations to widen coverage area. One station was moved to the far east side to provide coverage for newly annexed areas, and the other two were moved in an attempt to cover the gap left by relocating far east. These changes contributed to the ISO Class 2 rating achieved in March 1988, which placed the Department in the top 1% of 46,703 rated departments.

In 1991, the 911 Division was created under the auspices of the Fire Department. The nineties also saw the addition of a fourth ambulance in response to the continuously increasing number of EMS incidents. As the number of licensed paramedics began to increase, so did the ability to staff fire apparatus at an advanced life support (ALS) level. The Department also began to equip fire apparatus with automated external defibrillators (AED) in 1996 to augment the level of first response. In an effort to provide a higher level of EMS care at all phases of an incident, the Department continued to work toward staffing all fire apparatus with a minimum of one licensed paramedic.

In an effort to improve the ISO rating and to increase aerial company coverage, the Department reinstituted the use of quint apparatus in 1996. Because of the staffing of the quint apparatus, a negotiated hours reduction, the additional ambulance, and the effort to comply with the federally mandated Respiratory Protection Act, 29 CFR1910.134 ("Two In - Two Out"), the Department increased company personnel to 240 by the year 2001.

Due to the catastrophic events occurring on September 11, 2001, the Department aggressively pursued the formation of a technical rescue team. The entire department was OSFM Technical Rescue Awareness (TRA) certified by the summer of 2002. Concurrently the Department had several personnel trained to the operations and technician levels of the various disciplines. As the State created MABAS Technical Rescue Teams (TRT), the Rockford Fire Department became the forerunner in Division 8, currently housing the TRT apparatus and equipment and providing two-thirds of the members of the State-sponsored MABAS Division 8 TRT. At this time four Department members were included in the Illinois State Urban Search and Rescue (USAR) team.

In 2002 a fifth ambulance was added in response to the continuously increasing amount of EMS incidents. Previously, the department had operated under four distinct divisions: Administration, Operations and Training, Fire Prevention, and the 911 Communications Center, each under the direction of a Division Chief or Administrator. However, with an increasing emphasis in the training arena to meet the many challenges resulting from September 11, 2001, and changes in personnel status - especially in the EMS arena regarding both paramedic training and delivery of EMS services - the Department began the transition to a five-division configuration. In 2003, Training became a separate division under the direction of a Division Chief with separate training coordinators for both EMS and fire.

By 2004 the Department had also reassumed the airport responsibilities and equipment, as the United Parcel Service opened a distribution hub at the Chicago-Rockford International Airport and passenger traffic began to increase. Airport rescue response personnel were upgraded to the OSFM Aircraft Rescue and Firefighting (ARFF) certification and began the extensive Federal Aviation Administration (FAA) required training. With the additional ambulance and reacquired airport responsibilities, the Department increased its staffing bringing the company strength to 252.

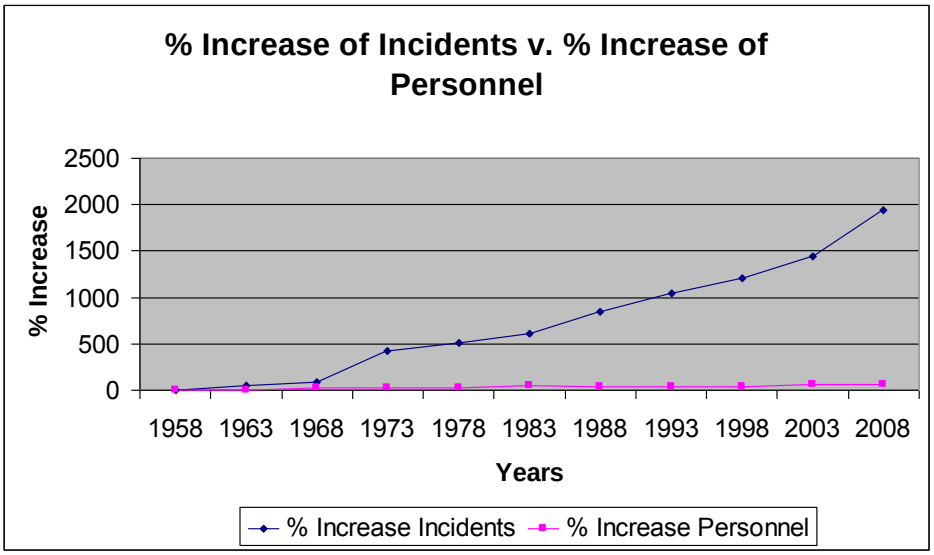
In response to Homeland Security Presidential Directives 5 and 8, which required adoption of incident command and implementation of the National Incident Management System (NIMS), the Department initiated the NIMS training for the City. Because of its experience in the use of incident command, an extensive instructor pool and training capabilities, the Department assumed the responsibility for training employees throughout the City in NIMS and completed the required training by October 2006.

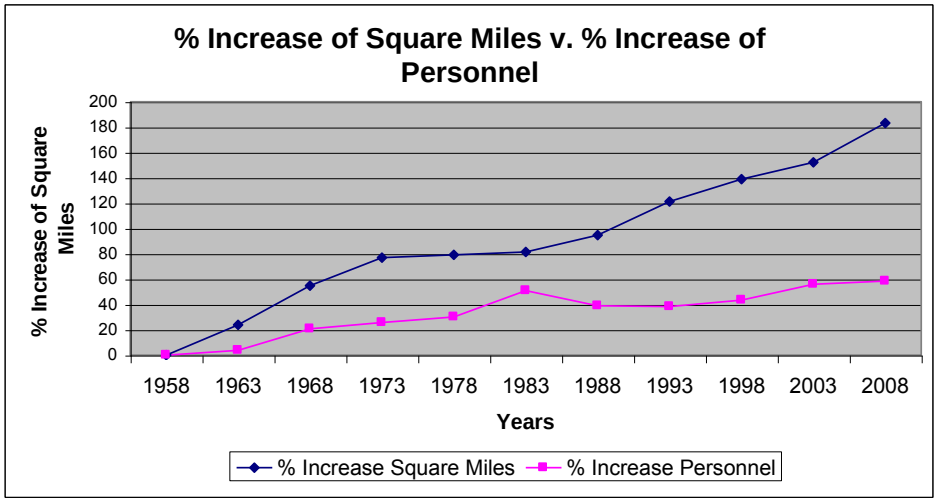
The most recent milestone achieved by the Department came in March of 2009, when it achieved ALS First Response licensure through IDPH, guaranteeing ALS first response on all EMS incidents.

Throughout the Rockford Fire Department's history, it has remained progressive in both the operations and deployment of services and responsive to community needs. Due to the relative isolation of the community, the Department has been at the forefront in the areas of training, hazardous materials response and technical rescue team development. Although

often restricted by budgetary constraints, the Department has aggressively attempted to address coverage needs and prepare for anticipated emergencies whether natural or manmade.

In contrast to the geographical growth and increase in incidents, the Department's staffing has remained relatively disproportionate. As depicted by the following charts, the Department has experienced a 183% increase in its geographical boundaries, a 1943% increase in its incident response, but a mere 58% increase in its number of personnel in the past fifty years.





Funding sources and restrictions

The majority of the Department's funding comes from the City of Rockford's General Fund. Supplemental funding is available through grants, the Foreign Fire Tax fund, and a dedicated

telephone tax used specifically for the 911 Communications Center. Because the City's budget is calculated on an annual basis and subject to City Council approval, obvious restrictions apply to any true long-range planning. Consequently, the budget has an overwhelming impact on the Department's decision-making.

While supplemental funding through grants does augment the Department's budget, most of these grants are time, equipment, and/or training-specific and do not provide a consistent avenue for funding. Foreign Fire Tax is a percentage allotment as designated by the Illinois Municipal Code of gross receipts received from fire insurance on properties located within the municipality to local fire departments for the maintenance, use, and benefit of the fire department. A five member internally-elected board, consisting of the Fire Chief and four other Department members, approves and distributes monies to the Department for maintenance and items that are not covered by the Department's normal operating or capital budgets. The Foreign Fire Tax funds are more consistent than grant monies and, unlike the City general fund, under direct control of an internal board, but represent only a small percentage of the Department's budget.

Topography and climate

Rockford is a mid-sized city located along both banks of the Rock River. The City covers 64 squares miles and has a last reported population of 150,115, making it the third largest city in the State of Illinois. Rockford is situated 715 feet above sea level, has a primarily flat terrain with occasional rolling hills, and in addition to the Rock River, has two lakes and several smaller bodies of water. The Rock River runs north/south through the heart of downtown Rockford dividing the City east and west, and is crossed by eight different bridges. The Rockford Fire Department provides emergency services to all areas contained within the City limits.

Due to its location Rockford has four clearly defined seasons, thus creating seasonal extremes in both summer and winter. The seasonal temperature range averages from 10 degrees Fahrenheit to 92 degrees Fahrenheit, with extremes of -27 degrees Fahrenheit recorded in 1982 and 112 degrees Fahrenheit recorded in 1936. These extreme temperature variations occasionally present challenges with regard to the delivery of emergency services. The Rockford area is prone to violent thunderstorms, which have left a discernable mark in its history. Because of the propensity for these violent storms, hail and strong winds are very common in the Rockford area. In the early hours of July 5th, 2003, microbursts caused major damage to the Rockford area, leaving over 70,000 residents without power for several days. Fortunately there were no reported deaths or injuries, most likely because the storm struck so early in the morning. However, the storm damages did cause a mandatory holdover and callback of personnel to aid citizens and assess damages.

On September 14, 1928, an estimated F4 tornado descended upon the southeast portion of the city resulting in 14 deaths and 36 reported injuries. The property damage was estimated to be 1.2 million dollars. On April 21, 1967, the neighboring town of Belvidere was struck by an F4 tornado, which left 24 people dead and over 400 injured. On January 8, 2008 yet another

violent storm left its mark on the Rockford area, when a tornado hit a community just northeast of the City. The Department provided a technical rescue vehicle and personnel to assist this community with rescue operations.

Rockford's annual rainfall is 36.07 inches, and over the past few years has recorded some of its heaviest flooding to date. On September 4, 2006, five inches of rain inundated the area causing flash flooding to residential and commercial areas, as well as major thoroughfares throughout the City. The Department played the primary role in rescuing citizens trapped in vehicles, homes and businesses. Less than a year later on August 7, 2007, the City experienced another torrential rain estimated to be between five and seven inches, which again caused flash flooding throughout the jurisdiction. The following day Rockford and Winnebago County were declared State disaster areas.

In addition to the challenges presented by the warmer months, the winter months can be as equally problematic. Rockford has an annual snowfall of 36 inches, and is prone to severe snowstorms and bitter cold temperatures. In January of 1979 over nine inches of snow fell in just a few short hours, representing one of the strongest blizzards in the City's history. This record snowfall was almost matched in December of 2006 and again in February of 2008. Both the December 2006 and February 2008 snowfalls received disaster funding from the Federal Emergency Management Agency (FEMA). The fire department works in conjunction with the public works department during these conditions to ensure that emergency vehicles are able to respond to incidents.

Population

The population of Rockford as of the 2000 United States Census Bureau is 150,115 with a distribution of 52% female and 48% male. The following is the breakdown by race:

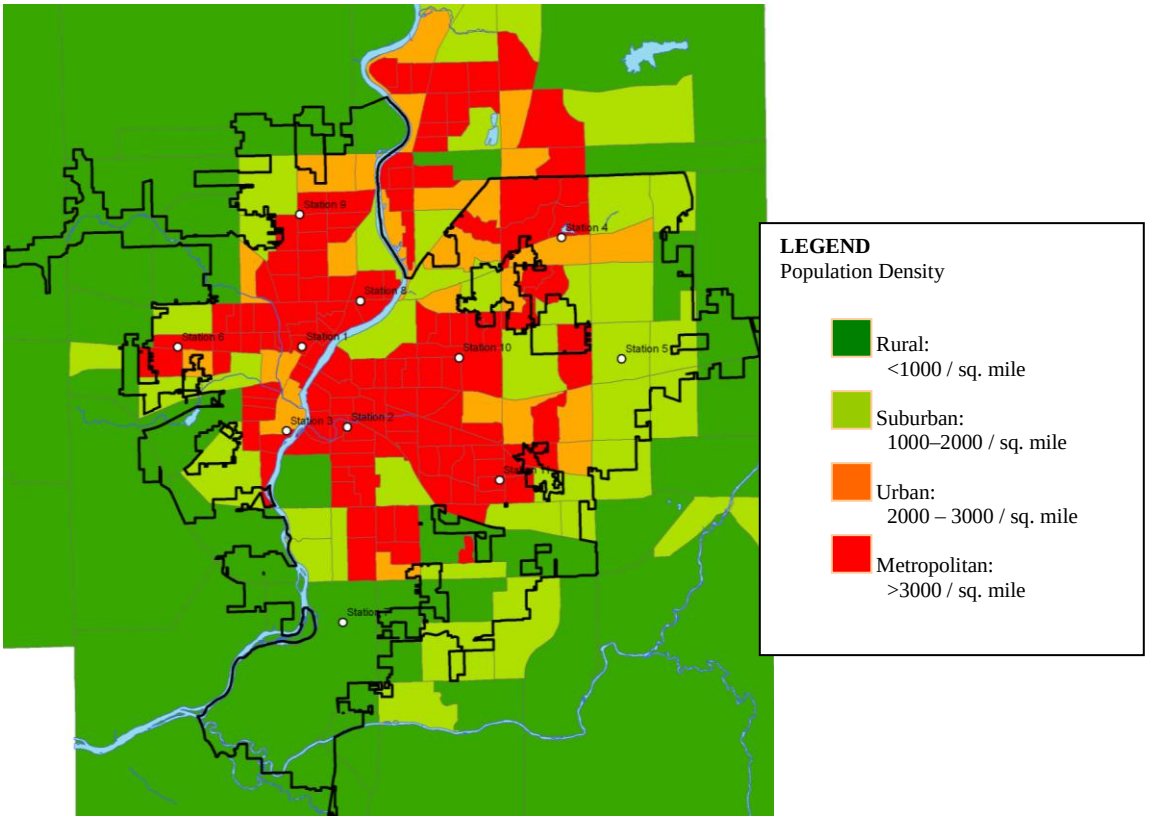
- White 72.8%
- African American 17.4%
- Asian 2.2%
- Other races 5.2%
- Two or more races 2.46%
- Hispanic or Latino of any race 10.2%

The service area is largely developed with an average population density of 2,680.4 per square mile. As defined by CFAI in the Standards of Cover Manual (pg. 20-21), the breakdown of the service area by population density reveals the following:

- 69.18% metropolitan (population density > 3000 per square mile)
- 10.06% urban (population density 2000-3000 per square mile)
- 15.72% suburban (population density 1000-2000 per square mile)
- 5.03 % rural (population density < 1000 per square mile)
- 0.01% wilderness/undeveloped (rural area not readily accessible by road)

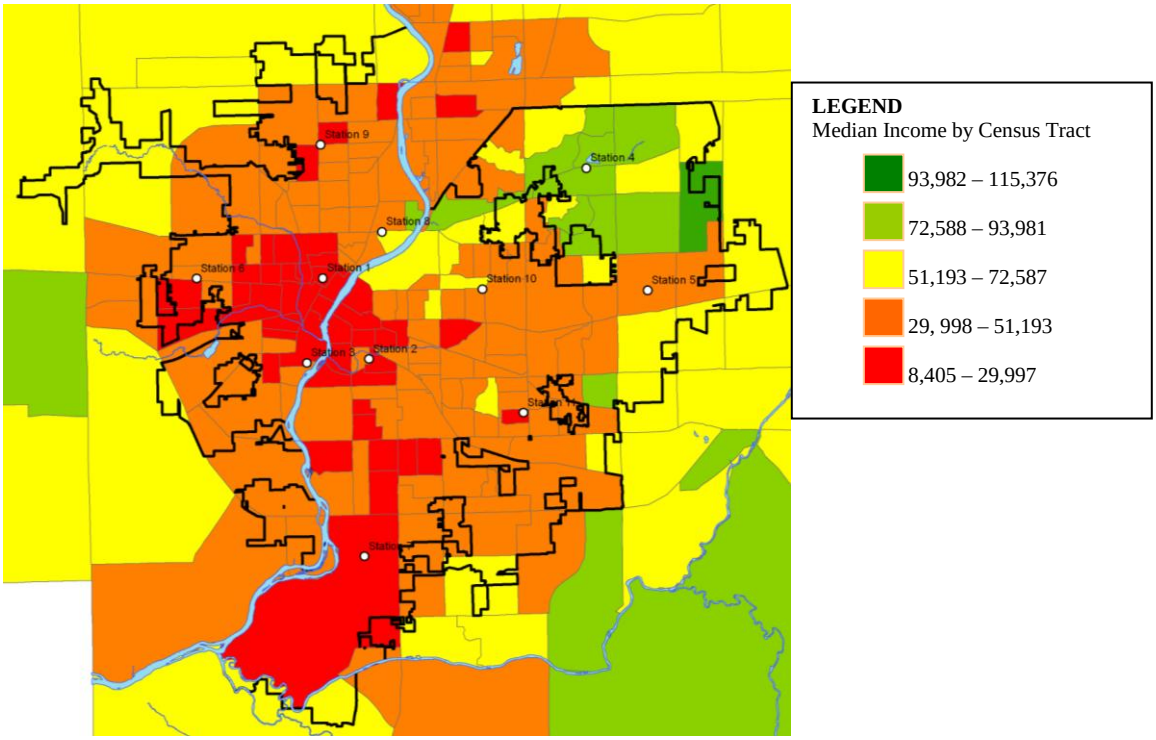
As illustrated by the following map depicting population density classifications, the population concentration is spread throughout the City with the most populated areas starting in the downtown area and spreading somewhat north and west, but mostly to the east. Although the City does have areas that meet the undeveloped criteria, these areas total .01% and are too statistically insignificant to be represented on the population density map.

Population Density (2000 Census)

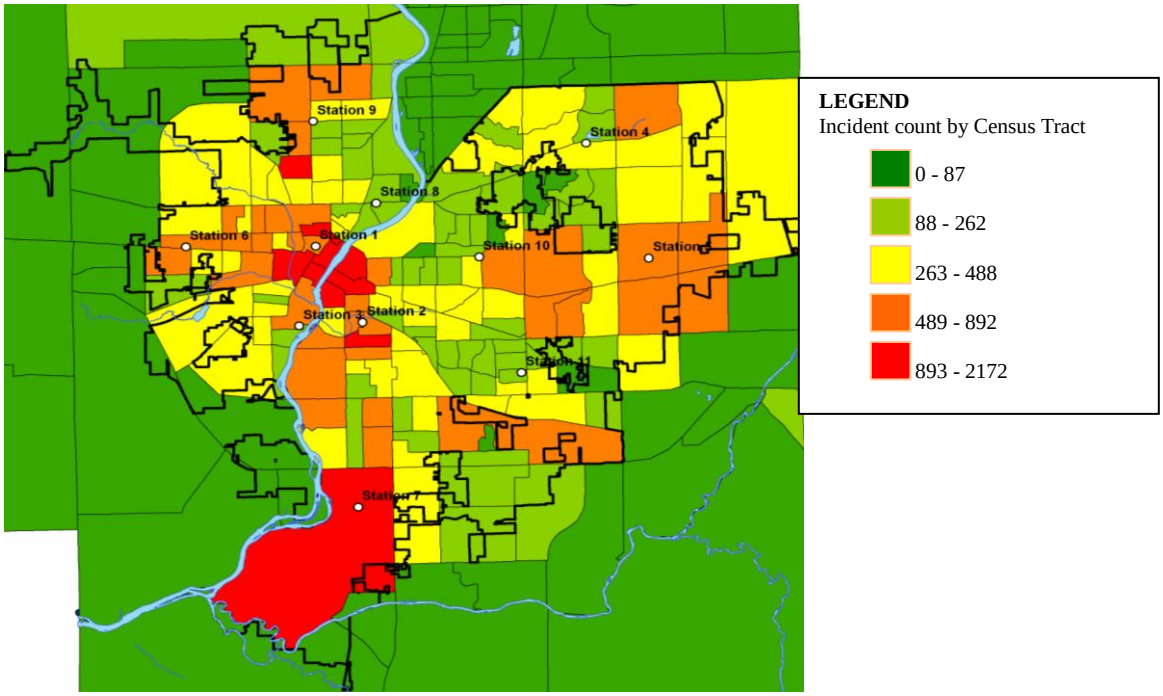


The City has several areas that are home to socially disadvantaged residents that place a higher demand on emergency services. As depicted in the following maps, there is an inversely proportionate relationship between the median income and incident density within the City. Historically, the lower income areas produce a higher incident volume creating a much higher demand for services. The Department has identified this relationship and referred to it as the "West State Street/Kishwaukee Street corridor," as these are typically the two main streets around which the greatest incident density is centered. In recognizing this demand on services, the Department has attempted to address the issue through station location. Comparison of the following two maps, clearly demonstrates the relationship between median income and incident density within the City.

Median Income by Census Tract (2000 Census)



Incident Density by Census Tract (July 2006 – June 2009)



Rockford has several institutions that house large numbers of "at risk" populations. The City is home to eleven residential high-rises, one residential school and 69 assisted living facilities. The high-rise structures are generally concentrated in the City's central downtown area while the assisted living facilities are spread throughout. Rockford College, the only residential school in the community, has several dormitory buildings that house an average of 300 students per school year. There is no available data to support any community racial concentration pattern; however, income statistics show a trend toward higher income households in the eastern areas of the City.

Development within the service area

Several general observations can be made regarding development categories and age in various sections of the City. The downtown area consists mainly of masonry constructed business and governmental office buildings. Age of these structures varies from older, historic buildings to new construction. The areas surrounding the downtown contain mostly older wood-frame residences, which include a sizable number of balloon-type construction. The western areas of the City have a large number of vacant or abandoned buildings of various occupancy and construction types. Industrial areas, including several industrial parks, are generally found to the southern and southeastern edges of the community and vary from small companies to large factories. Retail businesses are generally found in the eastern portion of the City. Newer residential areas, including many light-weight constructed homes, are mostly concentrated in the northeastern areas of the City. The majority of the City's hotels, which are generally of new or newer construction, are located far east near the I-90 interstate highway. The City is also home to several parks, golf courses and a network of recreational pathways that are dispersed throughout the community.

The City sits at the junction of three major highways: Interstate 90, Interstate 39, and State 20. These highways border the City to the east and south, and for the most part, are not within the City limits. The Department's jurisdiction contains only a small portion of these highway systems. There are several railways that pass through the City, and are presently limited to freight trains only. The Rock River bisects the community but is limited to recreational boating. The City is also home to The Chicago-Rockford International Airport, which is situated on its southern edge. As mentioned before, the airport is a major cargo hub with some passenger traffic.

The Rockford Fire Department began as a volunteer organization 154 years ago and has continued to evolve in response to the growing needs of the community. Over the past century and half, the Department has answered the community's needs through expansion in equipment, coverage, services and levels of service. The City of Rockford's culturally and socio-economically diverse population, seasonal weather variations, and various building stock have created a dynamic environment in which our organization has thrived. As detailed in the Department's mission statement, throughout its history the Rockford Fire Department has and continues to take great pride in its ability to provide emergency medical services and to safeguard its citizens from fire, disasters (natural or manmade), terrorist threats, and hazardous materials.

Current Services Provided

At the direction of the Fire Chief, the Department provides emergency services through a scalar organizational structure which currently consists of five different divisions that all work collectively to ensure a coordinated and comprehensive approach to providing excellence in services to the citizens and customers of Rockford. (Appendix 1A – Rockford Fire Department Organizational Chart).

Operations

The Operations Division is administered by a Division Chief, six District Chiefs and a Secretary. The Department's resources currently include eight engine companies, three quint companies, two ladder companies, and five ALS ambulances companies which are all distributed between eleven fire stations located throughout the City (Appendices 1B - 1E: Rockford Fire Department 2009 Deployment Inventory, Engine Still Territories, Aerial Still Territories, and Ambulance Still Territories). The current daily minimum staffing level is 64 personnel. The Operations Division conducts all emergency operations of the department including emergency medical services, fire suppression, hazardous materials mitigation, vehicle extrication, technical rescue, water rescue, and airport rescue.

Emergency medical responses comprise 77% of the total incidents. The Department dispatches the closest fire apparatus and the closest ambulance to all medical calls. Both the Department's fire apparatus and ambulances are licensed at the Illinois Department of Public Health (IDPH) advanced life support level, and personnel licensure includes 183 EMT – Paramedics and 81 EMT – Basics.

Fire suppression responses comprise 9% of the total incidents. The Department provides advanced fire suppression with 194 personnel certified to the National Fire Protection Association (NFPA) advanced standard and 70 personnel certified to the NFPA basic standard. Driver/Engineers are certified at the OSFM Fire Apparatus Engineer levels.

The Department offers a technician-level hazardous materials response unit, with 66 personnel certified at the OSFM technician level and 115 personnel certified at the OSFM operations level. The hazardous materials response apparatus consists of a command/equipment vehicle and a decontamination vehicle.

The Department has one heavy rescue company located on each side of the river, with 65 OSFM Roadway Extrication certified personnel.

The Department offers Illinois state-validated technical rescue services at the technician level. The OSFM technical rescue certification program consists of two levels in four different disciplines: rope, trench, confined space and structural collapse. Currently, 52 personnel are certified in one or more of these disciplines. The technical rescue response vehicle houses all the equipment necessary to accomplish the tasks required by the four different disciplines, in addition to an all terrain vehicle.

The Department has a water rescue team which consists of 20 Professional Association of Dive Instructors (PADI) certified divers. The Department requires the following three certifications as part of the qualifications for the dive team: Advanced Open Water, Search and Recovery, and Rescue Diver. The dive apparatus includes a dive equipment vehicle and three custom-designed boats.

The Department is also responsible for airport rescue. Currently, 61 personnel are certified at the OSFM Airport Rescue Firefighter level (ARFF) and meet the Federal Aviation Administration Part 139 training requirements. The airport rescue equipment consists of two aircraft firefighting vehicles with a total of 3150 gallons of water, 420 gallons of Aqueous Film Forming Foam (AFFF), 500 pounds of dry chemical extinguishing agent, and 460 pounds of clean agent, which satisfies the requirements for an FAA Index C airport.

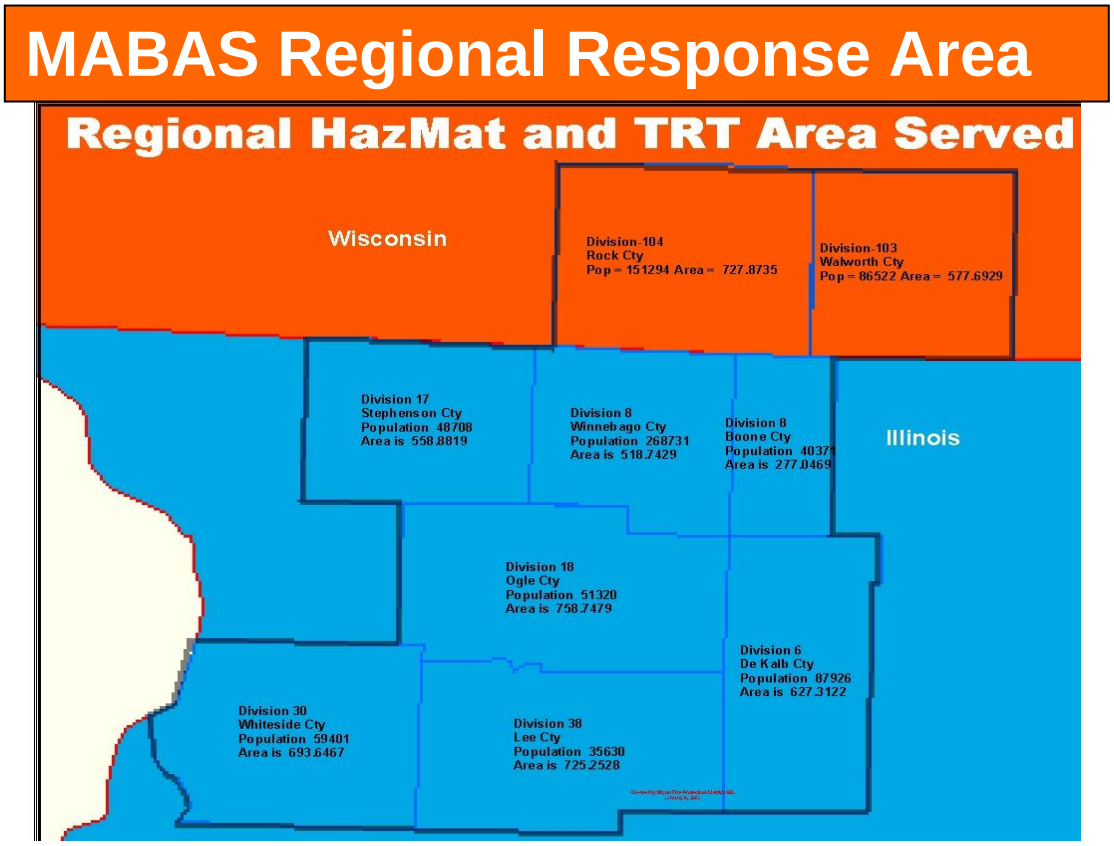
The chart below depicts the incident response by type of call:

Incident Response by Type

Incident types	July '06 - June '07	July '07 - June '08	July '08 - June '09	Total
Fire Response	1,934	2,008	1,884	5,826
EMS	16,399	18,075	18,025	52,499
Hazmat	9	6	21	36
TRT	13	10	7	30
Water Rescue	30	28	14	72
Vehicle Extrication	27	19	17	63
ARFF	23	84	78	185
CO Response	236	420	511	1,167
Other	3,214	3,266	2,914	9,394
Total	**21,885**	**23,916**	**23,471**	**69,272**

It is important to note that approximately 13% of responses described as "other" include such calls as downed power lines, arcing wires, lift assists, odor investigations, and gas leaks or spills.

The Rockford Fire Department is a member of Mutual Aid Box Alarm System (MABAS) Division 8 which is comprised of twenty-five (25) fire departments. The Operations Division coordinates with other MABAS Division 8 member agencies, which allows the sharing of resources within 795 square miles. Intergovernmental agreements between seven other MABAS divisions increase available resources and provide for a two-way response area of 5,466 square miles. MABAS also makes additional resources available through a State-wide response plan. The Department's primary participation in MABAS is in the areas of special operations response assistance for water rescue, hazardous materials and technical rescue incidents. The following map shows the MABAS regional response area.



The Operations Division also develops the City Disaster Plan, analyzes incidents to determine the effectiveness of actions and procedures, develops new operational equipment and techniques, coordinates with MABAS member agencies; and upon authorization by the Mayor, the Operations Division Chief activates the Emergency Operations Center (EOC) to conduct Emergency Services and Disaster Agency (ESDA) activities.

Administration

The Administration Division is staffed by a Division Chief, an Equipment and Safety Manager, a Shop Coordinator, two Fire Equipment Specialists and clerical staff. The Administration Division prepares and administers the Fire Department budget totaling $36,772,227 (2009), formulates Department financial policies, and establishes and administers the Department capital improvement plan. The division also provides clerical, data processing, maintenance and other administrative support to all other Divisions within the Department.

Training

The Training Division is staffed by a Division Chief, a Fire Training Coordinator, and EMS Coordinator and a secretary. The Training Division is responsible for the design, delivery, and

documentation of all educational programs involving Department personnel. These programs are intended to improve the firefighting, emergency medical, rescue, and hazardous materials response capabilities available to the citizens of Rockford as well as meet the requirements and objectives of federal and state agencies. Additional duties include the presentation of Department-related training and demonstrations to various organizations throughout the community.

The division's four member staff works with other fire departments, City departments, Rock Valley Community College, and the Illinois Fire Service Institute (IFSI) to provide an integral corps of certified instructors to satisfy their needs and goals. The Department has 108 personnel certified at the OSFM Instructor I level, of which 52 personnel are also certified at the OSFM Instructor II level. Additionally, the Department is approved by the Secretary of State to provide Third Party Driver's Certification for personnel. Using the Department's extensive library, qualified training facility and off-site locations, the Training Division works to provide industry standard training opportunities to all Department personnel.

Fire Prevention

The Fire Prevention Division is staffed by a Division Chief, a Fire Prevention Coordinator/Investigator, two arson investigators, five fire inspectors, and a secretary. The Fire Prevention Division is responsible for the inspection of commercial/industrial property, interpretation of fire prevention codes and ordinances concerning the properties, presenting talks and demonstrations relative to fire prevention and public education, investigating activities and related follow-up to arson investigations, and reviewing all plans for construction to ensure compliance with the proper fire and life safety codes within the City. The Division performs an average of 300 investigations, 2650 inspections and 440 public education visits per year.

911 Communications Center

The 911 Division is staffed by a Division Administrator, Training Supervisor, Technical Services Coordinator, Master Street Addressing Guide (MSAG) Technician, four shift supervisors, four assistant shift supervisors, 44 telecommunicators and a secretary. The 911 Division is responsible for taking emergency 911 and non-emergency calls for the City of Rockford, and dispatching the appropriate fire, police and emergency medical equipment.

The goal of the 911 Center is to provide the vital link between the citizens of Rockford and the appropriate emergency service agencies for fire, police and emergency medical service. This is accomplished by routing the incoming emergency and non-emergency calls for service from citizens, providing pre-arrival medical instructions to the citizens until the appropriate agencies arrive at the scene, and ensuring that citizens receive public safety services by dispatching the appropriate fire, police and emergency medical service in the most expeditious manner.

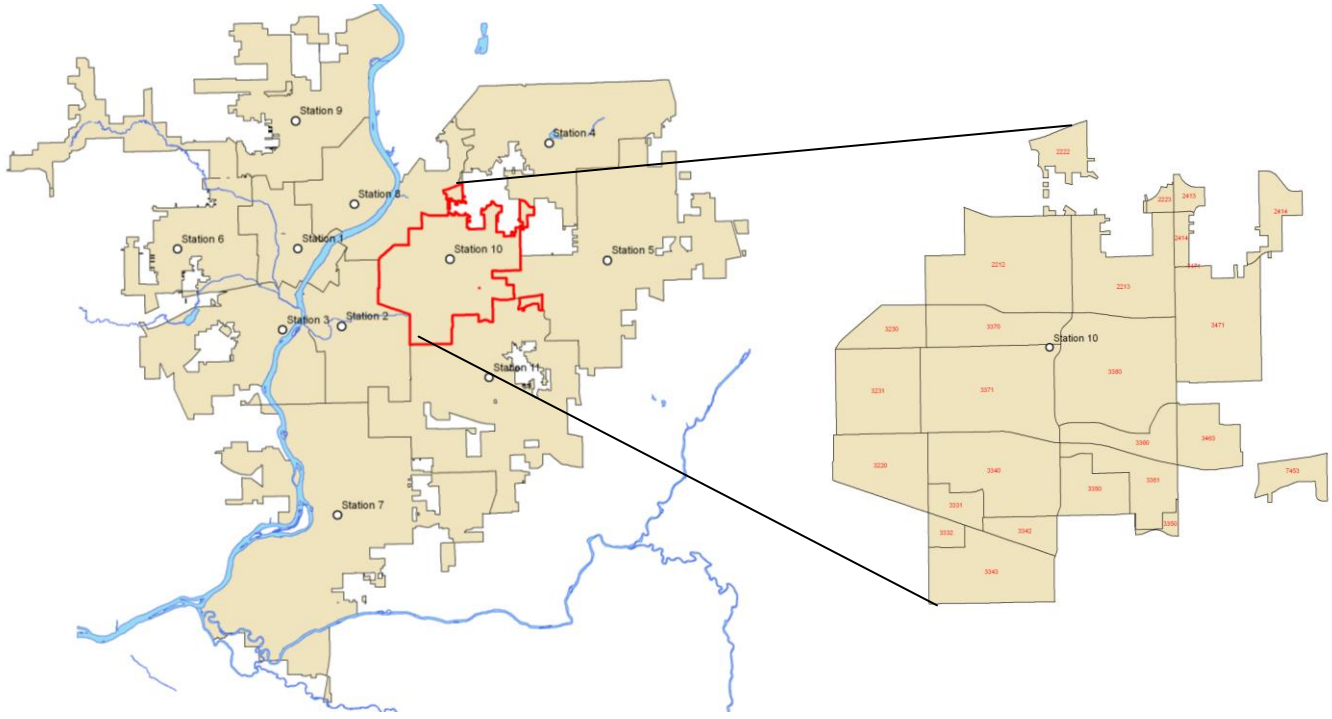
Besides the primary responsibilities as the public safety answering point (PSAP), the Rockford 911 Center has a reciprocal relationship with the Sheriff's Emergency 911 Communication Center, with each serving as the backup center for the other.

In 2008, the 911 Center handled 268,017 incoming calls for service, of which 137,536 were received via the 911 emergency lines and 130,481 were received via the non-emergency lines resulting in 199,110 total dispatches. Department response represented 24,488 of the Center's total dispatches.

Community baselines

The Department has developed a response plan based on the geographical boundaries of the City. The overall jurisdiction is divided into individual still territories for each company. Each still territory is then divided into fire management zones, locally known as service zones. These service zones were developed from a transportation study customized to address Department needs. The zones are designed to allow additional subdivisions as land use changes over time, and are utilized by the Computer Aided Dispatch (CAD) system to define recommendations for units to respond during needs for service. Service zones also act as a planning tool for evaluating standards of coverage and risk. The service zones provide a spatial relation to act as service demand zones as defined by historical need for service, physical occupancies within the zone, and population residing within the zone. Service zones are scaled to allow both metropolitan and undeveloped land to have applicable historical tracking and perceived risk in relation to their physical area.

City of Rockford
City Limits - Still Territories - Service Zones



Community Expectations

In September of 2007, the Rockford Fire Department invited "external stakeholders" from the community to participate in a community-driven strategic planning exercise. Eighty-one people working or living in Rockford served as a Citizens Advisory Group. The Citizens

Advisory Group engaged the process with a genuine concern and demonstrated a commitment to assist the Department, by providing input that ranked the priority of services delivered.

Working with guidance from the Center for Public Safety Excellence (CPSE), the Department developed a survey (Appendix 1F: Customer Centered Strategic Plan) that allowed for customer input and prioritization of services. After orienting the members of the Citizens Advisory Group about the services that are provided by the Department, members were ask to rank those services through a process of direct comparison. The following table displays the results of that exercise.

Community Services Ranking		
Services	**Ranking**	**Score**
ALS Paramedic EMS	1	487
Fire Suppression	2	465
Basic Rescue	3	373
Advanced Rescue	4	341
Hazardous Materials Mitigation	5	320
WMD/Bioterrorism	6	251
Fire Inspection	7	203
Fire Investigation	8	161
Community Fire/EMS Safety Education	9	134

Additionally, the Citizens Advisory Group provided expectations of the service delivery by the Department. Feedback was given that supplied positive comments as well as opportunities for improvement. To successfully gain an understanding of the community expectations for its fire and emergency services organization the question was asked, "What are the expectations you have for your fire department?" The following are the opinions as expressed by the community group:

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- Quick response to emergency calls.
- Response with expertise and equipment needed for the emergency.
- Safety education for the community.
- Strong interaction with the community.
- Diverse workforce that matches the community profile/culture.
- A fire department presence at community festivals, events and activities.
- In partnership with local health care providers.
- Readiness to deal with weapons of mass destruction.
- Timely paramedic services with state of the art pre-hospital care.
- Courtesy and professionalism.
- Fair and equal treatment/response city-wide.
- Public awareness of fire department activities and services.

- A knowledgeable, well trained, qualified workforce.
- Emphasis on community fire and injury prevention.
- A safety focus on the citizen and the firefighter.
- To have the necessary staff, equipment and training to provide their services.
- Mandates and support programs for child safety.
- Media relations and control.
- Leadership and control during emergencies.
- Code enforcement.
- The provision of fire and EMS services that represent the best quality and standards.
- Participation with the development of safety procedures in manufacturing.
- Continuous improvement.
- Knowledge of the streets and addresses of buildings in the city.
- A physically fit and well disciplined department

By evaluating the community, services provided, Department capabilities, and citizen expectations, an appraisal can be made to determine if coverage correlates with the level of risk. This is important because it has historically been the Department's mission to be proactive in its approach to public safety.

The next step, then, must be to assess the risks within the community.

Section Two: Risk Assessment

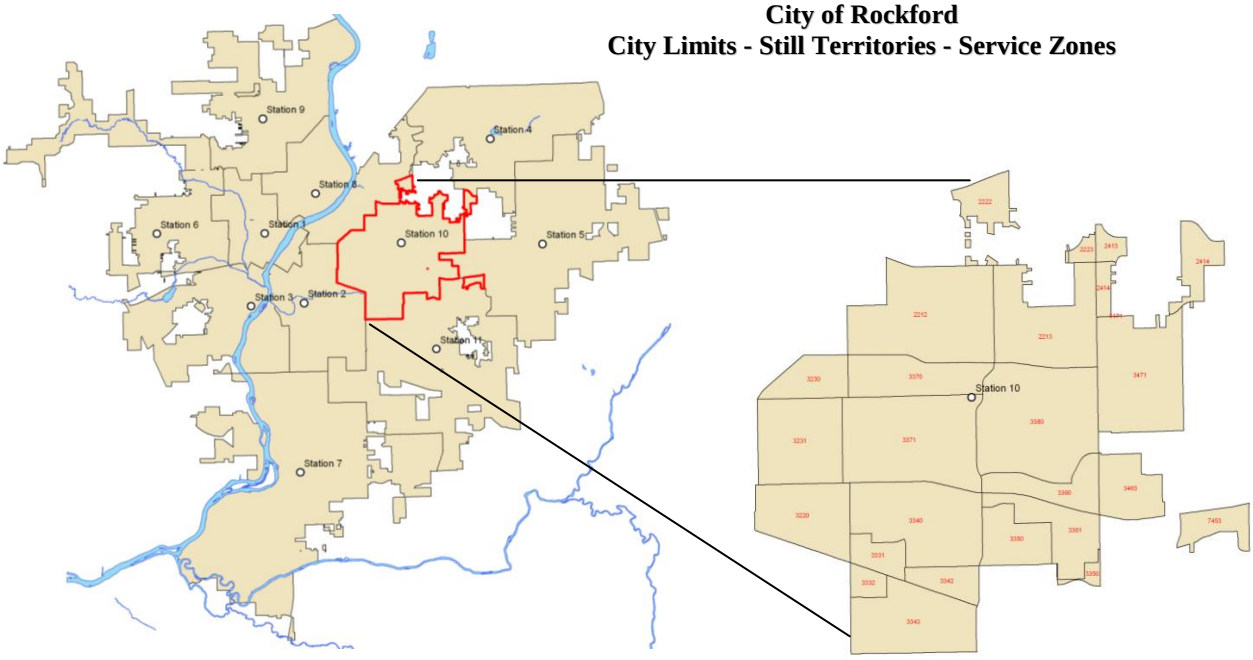
Introduction

The Rockford Fire Department practices an all hazards approach to emergency management and planning. Risk is defined locally as the likelihood of occurrence, the potential for life loss or injury, local impact, and monetary cost. Risk is then identified by using historical data, zoning classifications, a Department-designed numeric risk matrix, fire protection system data, and water supply. These factors combine to allow the Department to identify and prepare for all emergencies and situations that have a potential to occur within the jurisdiction, with an emphasis placed upon the likelihood of occurrence.

Development of geographic zones

In an effort to provide risk planning, the geographic boundaries of the City are divided into company still territories. Physical location and accessibility determine which fire apparatus would respond first to an emergency in that still territory. Each fire company has a still territory which is further divided into multiple service zones, as described in Section One. These service zones give the Department a more accurate avenue for identifying potential risk, other than relying on census tract data and company still territory data. This tiered effect of still territories and service zones allows for more focused planning than would be offered simply by a polygon of a predetermined size surrounding a fire station.

The Fire Department continually addresses the service zone system to ensure accuracy and make changes as annexations occur, land use changes, or historical data evaluation indicates a need for reassignment or change in the physical shape or size of a service zone. The following map illustrates the concept of the tiered approach with still territories and service zones.



Predicting calls for service

As a starting point for risk assessment, historical calls for service are considered a predictor of future needs for service. The Department has maintained historical data of response in either paper or electronic format since its inception in 1881. Current Department reporting uses the National Fire Incident Reporting System (NFIRS). The Department has electronically recorded the incident types, deployment of resources, and other pertinent data since October of 1999 in Firehouse brand software. Additionally, since 2006, all incidents have been geocoded by physical location according to latitude and longitude, plotted on the City map, and placed into their respective service zone for analysis.

In addition to historical need for service, historical data referencing hydrant flow and maintenance information, occupancy inspections, training, and Department maintenance are also maintained in the Firehouse electronic reporting system. All of the data that references something with a physical location, like a fire hydrant, is identified and located in the proper service zone for analysis. Occupancy inspections are of special note regarding risk assessment. Physical occupancies within the City are evaluated for risk through occupancy inspections and land use planning, which allows for potential, magnitude and probability of occurrence to be considered in our community risk assessment.

Zoning and land use

The City has a published zone and land use map that divides areas in the community into residential, commercial, industrial or residential/mercantile. These areas are further divided within each service zone for specific occupancies. The occupancy categories correlate with the definitions as provided by the International Fire Code (IFC), 2003 edition. The occupancy must adhere to zoning requirements in the areas of specific use, construction type, chemical inventory and fire protection systems. As a result a map can be created using geographic information systems (GIS) software to display the intended zone use and actual classified occupancies within each service zone.

In addition to the zoning classification, additional risk analysis has been performed on the individual occupancies to allow for a uniform risk rating to be applied. The risk rating is designed to be a uniform, communitywide attribute linked to individual occupancies for a detailed risk analysis. Data for the risk rating has been gathered from the Insurance Services Office (ISO) records, inspection records, building permit applications, certificates of occupancy, and field level inspections conducted by company personnel during the accreditation process. Individual occupancy data has been entered into the Firehouse database.

Incident risk categories

The Department currently defines different risk categories for both fire and EMS response. Fire incidents are categorized as low, medium, high or special based on the type of incident, the type of structure and/or the inherent risk. Fire incidents defined as low include fires except a structure fire, i.e. dumpster fires, car fires, open burning calls, etc., and receive a single still

engine response. Incidents defined as medium include non-hazmat large/semi truck fires which receive one engine and one aerial, or residential structure fires, to include one and two-family structures, which receive a response of three engines, two aerials, two district chiefs, and one ambulance. High risk incidents are defined as commercial/industrial structure fires or multi-family residential structure fires, and receive a response of three engines, two aerials, two district chiefs, and one ambulance. Special risk incidents are considered to be highrise or hospital fires, and receive four engines, two aerials, two district chiefs and one ambulance.

The EMS risk categories are based on the type of incident. A low risk EMS incident is defined as any general medical call, i.e. chest pain, trouble breathing, fall victim, diabetic emergency, seizure, etc., and receives one fire apparatus and one ambulance. A medium EMS risk incident is defined as a motor vehicle accident with injuries or a motor vehicle versus pedestrian incident, and receives one fire apparatus and one ambulance (unless additional units are needed upon arrival). A high risk EMS incident is defined as an incident requiring extrication which and receives one engine, one heavy rescue apparatus, one ambulance and one district chief. Special risk EMS incidents include such calls as school bus accidents, shootings, etc., which receive one fire apparatus, one ambulance and one district chief (unless additional units are needed upon arrival).

Incidents which require specially trained personnel and specialized equipment, such as hazardous materials, technical rescue, airport rescue, and water rescue incidents receive a proportionate response based on information received by the call taker.

Numeric Risk Assessment

Overview

The numeric risk assessment accounts for several risks that may affect a given area in the community. Occupancies in the community are given an occupancy risk score based on a Department-designed matrix. The occupancy risk score in combination with a fire density score, an occupancy density score, and a response time score provides a numerical assessment for each service zone within a still territory. An average score is then calculated for the entire still territory.

Occupancy Risk Score

A risk matrix was designed by the Department to provide a numeric risk rating for fire and life hazards for all occupancies. Occupancies are grouped into four general risk categories: low (normal), moderate, high and special risks. The special risk occupancies include specialized industrial processes, irreplaceable cultural or historical status, etc. To account for special hazard assignment, the numeric risk rating is assigned a risk identifier, if applicable. The risk identifier allows the Department to further evaluate risk by providing selection criteria such as highrise, fire flow and unusual life hazards.

The combination of a numeric rating and risk identifier allows further assessment of occupancies within a risk group. As an example, two occupancies can be in the moderate risk group, but through a combination of installed fire protection or other attributes, the occupancies can have a different numeric risk rating. The numeric risk rating is calculated in a Department-written Excel program which electronically matches the attributes in the individual occupancy record to a risk matrix.

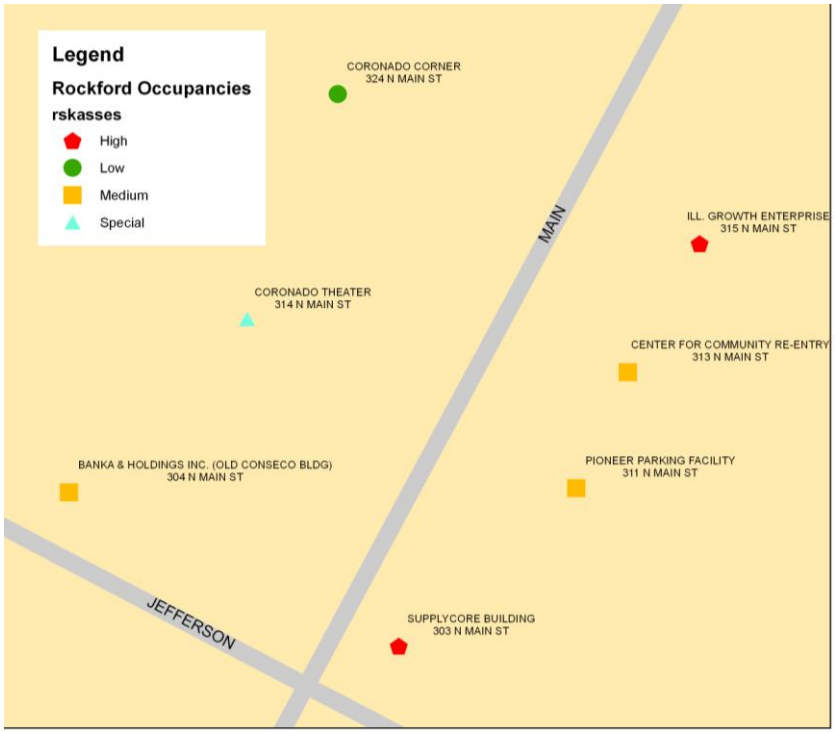
The risk matrix is designed to add risk points for hazards and credit the score for fire protection and alarm. Fire protection and systems that address suppression and detection are incorporated into risk assessments. Positive credit is given to both alarm and suppression systems. Suppression systems are weighted to provide more credit than an alarm system. These protection systems are managed both by an established approval process during new construction and fire inspection practices in existing buildings. The resulting risk number, together with any manually applied special risk identifier (such as excessive fire flow, high rise or especially high life risk) is entered into the Firehouse database. This data can then be leveraged in GIS software to provide a geographic-based risk assessment. The following table illustrates the risk matrix as generically applied to different types of occupancies:

Risk	**Criterion**				
Occupancy Use	Business, Hotel/Motel, Single Family Residential	Theaters, Multi-family Residential, Mercantile	Assembly, Nightclub, Institutional, Medium Hazard Factories	High Hazard Factories, Special	
Risk points	1	2	3	4	
Building Size	< 3000 ft^2	3001-9000 ft^2	9001-12000 ft^2	12001- 15000 ft^2	>15000 ft^2
Risk points	1	2	3	5	6
Height	1-2 story	3 story	4-6 story	6+ stories	
Risk points	1	2	4	6	
Residential	No	Yes			
Risk points	0	1			
Fire Alarm	No	Yes			
Credit score	0	-1			
Sprinkler	No	Yes			
Credit score	0	-2			
Occurrence	<10 year	>10 year			
Risk points	0	1			
Identifiers					
Fire flow	F				
Highrise	H				
Life Hazard	L				

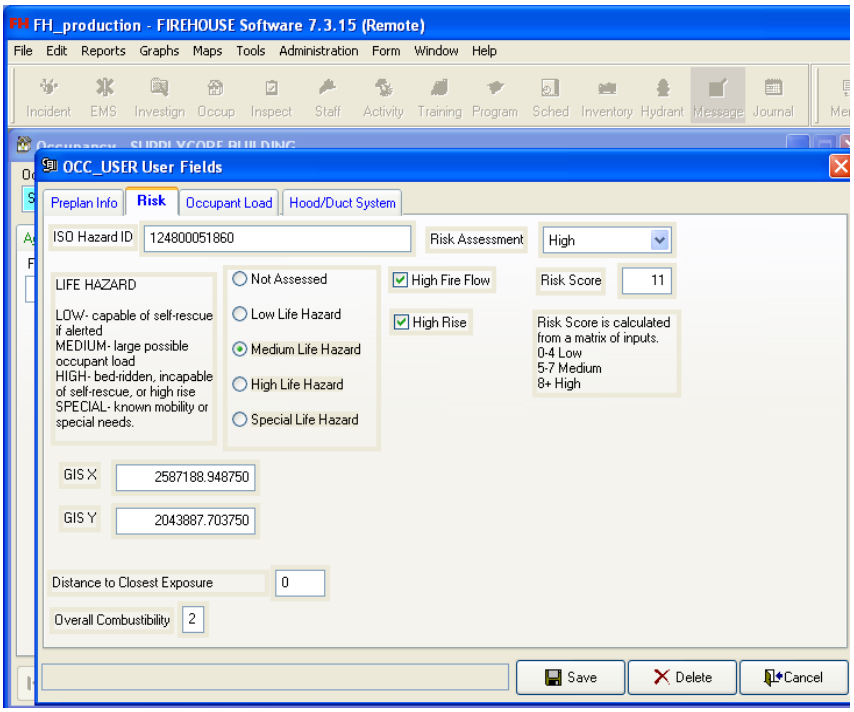
The following chart illustrates occupancy risk scoring as applied to specific structures within the City:

Example	*Occ*	*Size*	*Height*	*Res*	*Alarm*	*Sprink*	*Occur*	*Score*	*Identifiers*	*Result*	*Risk Assessment*	
Coronado Theater	3	6	2	0	-1	-2	1	9		9	**High**	**Special**
Supplycore	1	6	6	0	-1	-2	1	11	FH	11FH	**High**	
Banka Holdings	1	4	2	0	-1	0	0	6		6	**Medium**	
Coronado Corner	1	3	2	0	-1	-2	0	3		3	**Low**	
Ill. Growth Enterprise	2	3	4	1	-1	0	0	9	H	9H	**High**	
Center For Community	1	3	2	0	-1	0	0	5		5	**Medium**	
Pioneer Parking Facility	2	3	4	0	-1	-2	0	6		6	**Medium**	

Sample Geocode Map



Sample Firehouse Software Occupancy Risk Page



Again, after the occupancies have been assigned the occupancy risk rating they are geocoded as to location and plotted on the City map using GIS software. The locations of the occupancies are then able to be both visually and mathematically compared to available water supply, available fire protection level and historical call demand. This grouping and evaluation of risk is modeled and studied in the GIS software, and then published both electronically and via printed paper maps to the City.

The following table shows the numerical value assigned to the occupancy risk score, the occupancy density score and the three-year average (July 2006 through June 2009) for fire density and response time scores.

Service Zone Overall Risk Assessment Score				
	Occupancy Risk	Occupancy Density	Fire Density	Response Time
Score	risk matrix score	occupancies/square mile	# of incidents	seconds
1	0 - 2.75	0 - 223.95	0 - 10.57	0 - 330
2	2.76 - 3.63	223.96 - 708.04	10.58 - 32.22	331 - 401
3	3.64 - 4.24	708.05 - 1602.83	32.23 - 68.72	402 - 492
4	4.25 - 5.10	1602.84 - 3033.57	68.73 - 141.51	493 - 807
5	5.11 - 6.79	3033.58 - 50823.43	141.52 - 410.01	808 - 2033

These scores are combined for each service zone, and the service zone scores are averaged for each station's still territory. The following table shows the average total risk score for each station's still territory.

Still Territory	Occupancy Risk Score	Occupancy Density Score	Fire Density Score	Response Time Score	Total Score
Station 1	3.48	2.63	1.90	1.62	9.63
Station 2	3.00	1.91	2.70	2.00	9.61
Station 3	2.50	1.22	1.89	2.17	7.78
Station 4	2.14	1.00	1.07	2.86	7.07
Station 5	2.73	1.20	1.20	3.13	8.27
Station 6	2.79	1.00	2.05	2.21	8.05
Station 7	2.43	1.09	1.43	3.22	8.17
Station 8	2.65	1.35	1.76	2.12	7.88
Station 9	2.06	1.28	1.56	2.17	7.06
Station 10	2.87	1.57	1.48	2.43	8.35
Station 11	2.66	1.24	1.41	3.21	8.52

In order to identify risk that is specific to individual still territories, the service zones are further analyzed and compared to one another within each still territory. (Appendix 2A: Relative Still Territory Risk Analysis). This information may be used to determine the need for changes at the service zone level. For example, service zones may be adjusted or moved to another still territory to address an increased response time.

Fire protection and alarm systems related to risk management

The City of Rockford requires fire alarm systems to be installed and maintained in accordance with the National Fire Protection Association (NFPA) 72: *National Fire Alarm Code*, and sprinkler systems to be installed and maintained in compliance with NFPA 13: *Standard for the Installation of Sprinkler Systems* and NFPA 14: *Standard for the Installation of Standpipes and Hose Systems*. These requirements are listed in the adopted fire code (IFC 2003). Fire protection and alarm systems are valued in the planning process, because they provide a greater incidence of self-reporting in the case of an emergency and, at times, automatically begin extinguishment. Automation lessens the delay in fire detection, alarm transmission, and magnitude of emergencies by alerting occupants to potential loss problems and providing limited automatic response.

A secondary water supply for automatic extinguishing systems is considered in the planning process. As part of the plan review process and ongoing fire inspections, the availability of hydrant water supply within 200' of the fire department connection is verified. Department Standard Operating Procedures (SOP) specify that apparatus will provide full support to installed sprinkler systems. Alarm systems may be required to directly report to the 911 dispatch center or through a listed third-party agency. Required alarm systems are mandated

to be properly maintained by the adopted fire code (IFC 2003). Once installed, a fire alarm or protection system is then listed in the occupancy's preplan and in the risk matrix. Such alarm systems and suppression systems lower the effective overall risk score applied to a particular occupancy by numerically crediting the risk score.

Using risk for various scenarios

A detailed occupancy evaluation allows data to be leveraged against various emergency situations. GIS software provides visual models which can be used to compare risk of a particular event with the Department's ability to provide resources for responding to that event. For example, large occupancies can be evaluated for fire risk against the ability to provide adequate water flow; places of assembly can be evaluated against the ability to provide emergency medical response; and occupancies required to have elevators can be identified and related spatially to the closest units capable of responding to elevator rescues.

GIS software is also used to build models that allow viewing of data with scaled colors from denser areas to lighter areas. A spatial model is used to divide each service zone into smaller, uniform units of measure. Each of these units is then assigned a value as it relates spatially to the surrounding units. For instance, dense clustering of high fire risk occupancies increases the risk for a particular area in general, as compared to isolated high risk occupancies. The spatial relationship is then visually displayed as a map of fire risk density, population risk density, or incident density overlaying defined service zones. Using this method provides both a visual and mathematical assessment of risk, and thus a method for risk planning and response plan development.

The computer model of risk is visually and mathematically evaluated with regard to the defined response plan developed by the Department. The response plan identifies both the initial and full compliment of responding units for various types of defined-risk incidents. The model is then compared to available staffing, station location, and ability to meet service demand. The service zones are adjusted based on calculated and historical response data in an effort to maximize the Department's ability to adapt to service demands.

Service zones that are identified as deficient for either travel distance or time coverage are evaluated. Changing the shape of service zones has proven effective in addressing deficiencies. As additional areas are annexed or planned for annexation, the computer model is again applied and evaluated. Results from this evaluation are designed to drive planning for additional response units through the identification of calculated travel distances and full compliment response capability, and is predicated by the presence of anticipated service demand. Areas without demand for service, like undeveloped acreage, may not fit the data model for response. For example, an area of open undeveloped acreage is given a lower priority when addressing response criteria.

Economic and demographic impact on risk assessment

The Department continuously evaluates historical losses, potential losses, available funding, and current fire suppression infrastructure in an effort to develop a response plan that addresses risk and potential threats to safety. The response plan is grounded in the scientific approach that while all areas of the City deserve the same protection, not all areas of the city pose the same risk or require the same coverage. Differences exist in occupancy density, demographics, and other related indicators which all impact the response plan. The Department has identified the most significant economic and demographic impact to be along the "West State Street/Kishwaukee Street corridor" and has provided a greater amount of overlap for initial coverage in this area with less overlap at the fringes of the City.

Non-fire risk assessment

In addition to the risk of fire, additional evaluations are performed using spatial modeling for other response call types. These call types include emergency medical services (EMS), extrication, hazardous materials, airport rescue, technical rescue, water rescue and general service response. The greatest historical demand for service has been in the area of emergency medical services, which accounts for approximately 77% of all Department responses.

The life risk evaluation also uses the locations of known high-life hazard occupancies to identify a potential need for service. For example, an assisted living center for the elderly can be identified through its occupancy use code and spatially modeled in the GIS software. Using the overlay of the potential demand zones with historical responses and/or general population density can help to determine if any relationships exist. Ambulances have been strategically placed at five different stations throughout the City. Additional ALS transport vehicles supplement the Department's response through agreements with local private ambulance services.

The Department has placed specialty vehicles throughout the City to address coverage for non-fire risks. Locations are based upon historical incidence, potential loss, and available space and staffing. Specialized training is provided for firefighters who would also have the primary duty of responding to any specialty emergencies. For example, the hazardous materials response unit is located on a major traffic corridor with properly trained responders and additional technician-level responders dispersed throughout the City.

Redundancy of coverage

The nature of calls for service will produce concurrent calls. Any single unit may only be at one incident at any given time. Emergency response to all areas at any given time drives the need to equip the Department with resources that not only meet normal service level requests, but also absorb peak call volume or large-scale deployments. For example, when several units are operating at a structure fire, additional units must be available to handle new emergencies that occur in these areas now vacated due to the structure fire. The Department attempts to

address redundancy of coverage by station placement and still territories in the higher incident density areas of the City.

In the event of a major incident such as flash flooding or a large storm that requires the response of multiple units all at once to handle concurrent calls in more than one location, the Department has the availability of putting reserve units into service. The Department maintains a fleet of ambulances, aerials, and engines that are fully equipped and can be staffed through an organized recall system. The mutual aid system can also be utilized to bring in resources from surrounding departments, if necessary.

Infrastructure and water supply

Response times are only one part of the overall risk assessment. As the primary component of infrastructure, water supply is also evaluated for risk. The City of Rockford is serviced by a municipal water system, which is a combination system of 39 wells, pumps, 36 above ground reservoirs and two elevated water tanks. The Water Division is the largest municipally owned ground water system in Illinois with an annual production of 9 billion gallons. Although the average consumption is approximately 25.75 million gallons per day, the system is capable of producing up to 60 million gallons per day.

Water is drawn from aquifers using the 39 wells, which are dispersed throughout the City at 35 different locations. Average well density is approximately one well per every 1.6 square miles. The wells vary from less than 100 feet deep to more than 1600 feet deep. Many of the wells are equipped with secondary power supplies to ensure adequate function of the water system in the event of a power failure. The water system is divided into four demand zones. Water demand, such as the opening of a fire hydrant, can be detected in the system, resulting in additional pumping to ensure that adequate volume is maintained.

The water system is designed to provide fire hydrants in relation to anticipated water supply demands. Consequently there is a higher density of hydrants in commercially zoned areas than in residentially zoned areas. As a maximum separation distance, fire hydrants are placed no more than 500 feet apart within the developed areas of the City. Special hazard areas, like a large shipping facility, are planned and built with water supply considerations in place.

Firefighting operations have not exhausted the available water supply in the City's immediate history. The water system extends beyond the physical borders of the City to include areas of planned annexation and service. Currently, the water system is undergoing a system-wide upgrade to further increase the pumping and volume capacity. The City requires developers to comply with the American Waterworks Association (AWA) standards and the City of Rockford adopted water supply code when new areas are designed and built. The Department's ongoing hydrant testing program verifies the adequacy of water supply for firefighting operations.

The Department equips its pumping apparatus with at least 1000' feet of large diameter 5" supply hose. This is designed to allow connection to hydrants at twice the maximum spacing

interval should a particular hydrant be out of service. Maps available to the resource officer and scene commanders show the interconnection of pressurized water mains to accommodate hydrant selection when more than one hydrant is utilized.

Through MABAS agreements tanker tenders are available to augment water supply, if necessary, in the event of catastrophic system failure.

Critical Task Analysis

The Department has identified critical tasks for different types of events or incidents. The critical tasks are considered to be minimum guidelines, and incident command may request additional resources as needed to accommodate any incident. Currently the Department's standard operating procedures (SOPs) include adequate resources on the initial dispatch to address all identified critical tasks and provide an effective response force (ERF). Due to incident frequency, more resources than are required for an ERF are included in the residential structure fire dispatch.

Residential Structure Fire

Critical Task	Personnel
Incident Command	1
Safety Officer	1
Attack line	2
Pump operator	1
Water supply	1
Backup line	2
Search and rescue	2
Ventilation	2
Utilities/forcible entry	2
Initial Rapid Intervention Crew	2
ERF	**16**

Commercial / Industrial Structure Fire

Critical Task	Personnel
Incident Command	1
Safety Officer	1
Attack line	2
Pump operator	1
Water supply	1
Fire Department Connection	4
Backup line	2
Search and rescue	2
Ventilation	2
Utilities/forcible entry	2
Initial Rapid Intervention Crew	2
ERF	**20**

Highrise Structure Fire

Critical Task	Personnel
Incident Command	1
Command aide	1
Safety	1
Fire floor safety	1
Forward branch	1
Elevator operation	1
Attack line	2
Pump operator	1
Water supply	1
Fire Department Connection	4
Backup line	2
Search and rescue	4
Ventilation	2
Utilities/forcible entry	2
Initial Rapid Intervention Crew	2
Stairway support	2
ERF	**28**

EMS

Critical Task	Personnel
Incident Command	1
Safety / ambulance operator	1
Advanced Life Support (ALS)	2
Basic Life Support (BLS)	2
ERF	**6**

Extrication

Critical Task	Personnel
Incident Command	1
Safety	1
Pump operator	1
Protection line	1
Extrication Branch	1
Extrication (technicians)	3
Caregiver	1
ALS	2
ERF	**11**

Hazardous Materials

Critical Task	Personnel
	minimum 8 technicians
Incident Command	1
Safety	1
Reconnaissance / Entry	6
Emergency decontamination	4
Science	3
Decontamination	6
Hazmat branch	1
ALS	2
ERF	**24**

Airport Rescue

Critical Task	Personnel
	minimum 2 ARFF
Incident Command	1
Safety	1
Fire suppression	5
Evacuation / extrication	4
ALS	2
ERF	**13**

Technical Rescue

Critical Task	Personnel
	minimum 10 technicians
Incident Command	1
Safety	1
Rescue branch	1
Logistics	1
Entry	6
Monitoring	2
Operational personnel	6
ALS	4
ERF	**22**

Water Rescue

Critical Task	Personnel
	minimum 8 divers
Incident Command	1
Safety (scene)	1
Dive branch	1
Water rescue branch	1
Safety (dive)	1
Boat operations	1
Search division supervisor	1
Search & rescue	4
Bridge operations	7
ALS	2
ERF	**20**

Currently the Department timestamps the following sentinel events for all structure fires:

- arrival times (incident command established)
- primary search
- water supply
- initial rapid intervention team (RIT)
- safety officer
- victim found
- victim removal
- utilities
- fireground assignments completed
- fire under control
- any change in mode of operation
- emergency traffic

- personnel accountability report
- rehabilitation
- termination of command

While documentation of these events does address the tactical priorities, there are additional elements necessary to evaluate the critical path of events throughout an incident that the Department historically has not recorded. Therefore, the Department has been unable to accurately evaluate the impact of the time-sequencing of arriving units. Currently, the Department is making strides to address this issue.

In addition to structure fires, the Department also timestamps victim removal during extrications, water rescue, and any technical rescue incidents.

Summary

In an effort to provide for potential emergencies within the community, the Department has developed a comprehensive approach to identifying risk for fire and non-fire incidents. The methodology for assessing risk involves a tiered approach by reviewing the jurisdiction as a whole, evaluating the individual still territories, and ultimately focusing on the service zones within each still territory. The Department has attempted to address perceived risks by strategically placing the appropriate resources and developing interagency agreements. This approach has allowed the Department to address current needs and plan for the future.

Section Three: Performance Measurement

Introduction

The Department has evaluated system performance through distribution, concentration, reliability and comparability. Performance was measured based on incident data over a three-year period from July 2006 through June 2009.

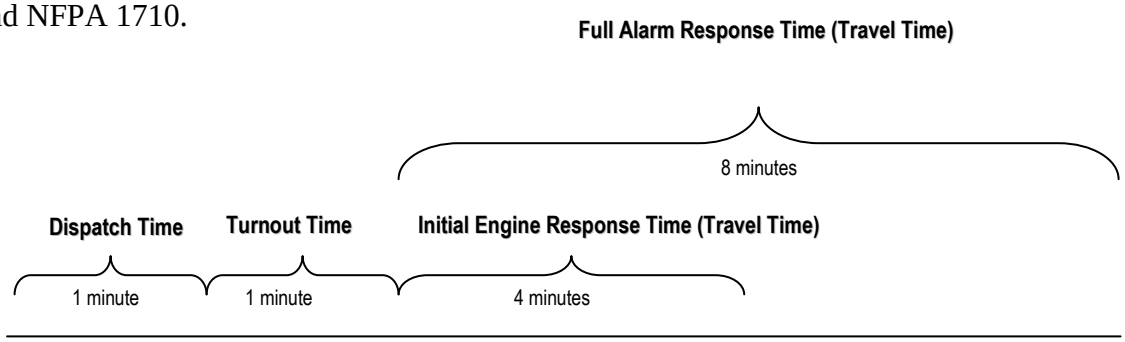
System Performance: Fire

The following is a an explanation of the Department's time benchmarks or goals as they relate to NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* which calls for a 1 minute dispatch time, and NFPA 1710: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* which calls for a one minute turnout time, a four minute initial engine response time (travel time), and/or an eight minute full alarm assignment response time (travel time) 90% of the time to a fire suppression incident.

Currently the Department is unable to differentiate between dispatch time and turnout time because of the inability to time stamp the acknowledgement of the alarm by responding units. Therefore, the Department combines these two times in its time benchmark. The total initial response time benchmark is six minutes: one minute for dispatch, one minute for turnout time, and four minutes for initial response time (travel time). The total full alarm response time benchmark is ten minutes: one minute for dispatch, one minute for turnout time, and eight minutes for full alarm response (travel time).

Although the Department has established a benchmark that includes dispatch and turnout time for both initial and full alarm response, it is important to note that the four and eight-minute travel times will be the focus for much of the analysis and performance measurement.

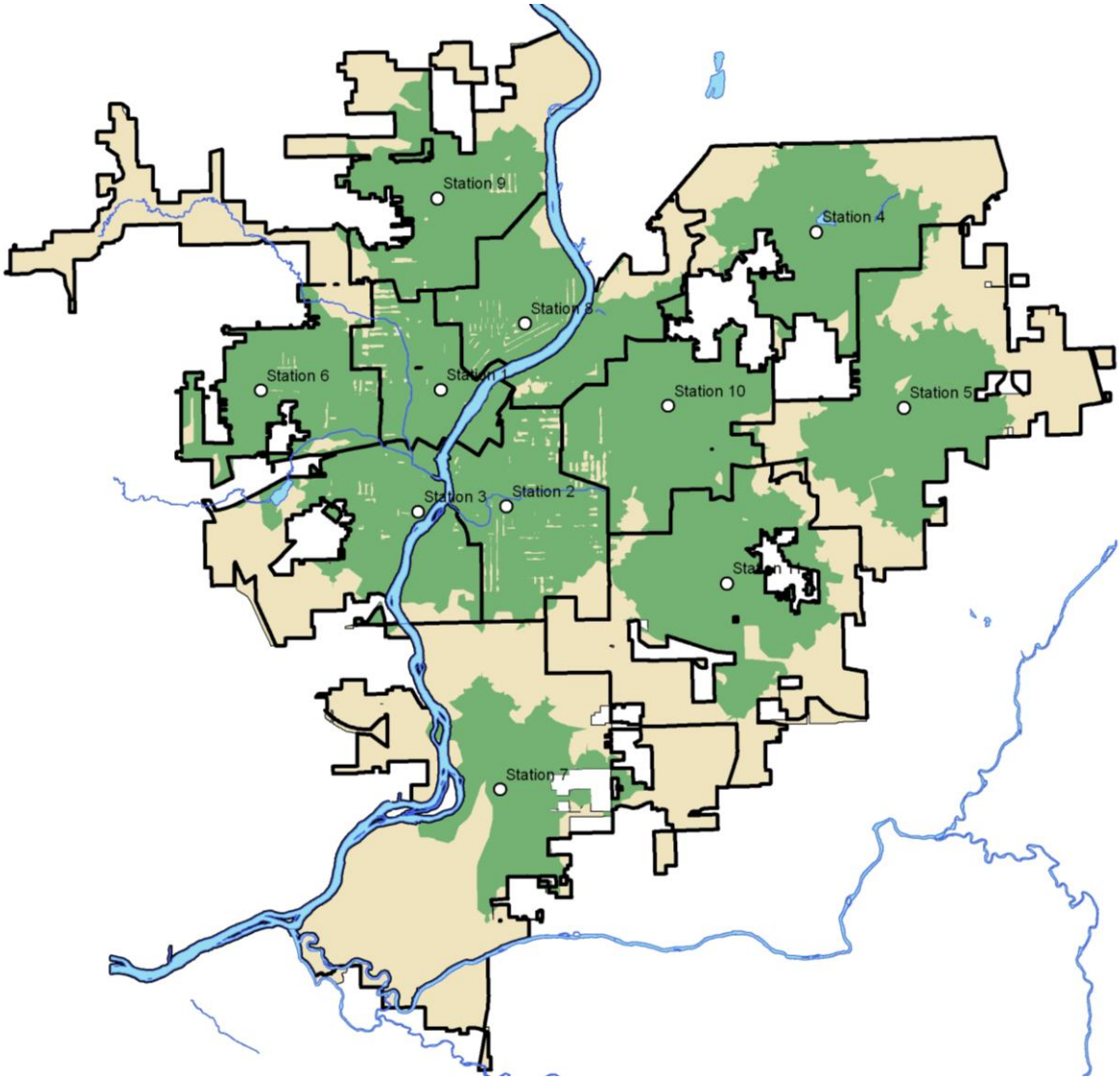
The time continuum below illustrates the Department's benchmark as it relates to NFPA 1221 and NFPA 1710.



Distribution

The Department has historically attempted to adhere to the travel distance recommendations of ISO, which are 1.5 miles of road travel for engines and 2.5 miles of road travel for aerials to all structures within the City. The Department has supplemented the ISO recommendations by including travel time and distance calculations afforded by GIS software, and detailed in the publication *ArcUser* (October – December, 2004). An evaluation of initial response coverage for the City can then be displayed on a map. The Department has several areas within the jurisdiction that fall outside the four-minute initial response catchment areas, as illustrated in the following map.

Four-Minute Initial Engine Response (Travel Time) Catchment Areas



The Department has attempted to maximize the catchment areas with the placement of available resources. The following table provides a comparison of the square mileage and the road mileage for each still territory as each relates to jurisdictional percentages and correlates to catchment area deficiencies.

Still Territory	Square Mileage	% of Total	Road Miles	% of Total
Station 1	2.15	3.39%	60.34	6.39%
Station 2	3.44	5.44%	94.82	10.04%
Station 3	5.58	8.81%	76.00	8.05%
Station 4	5.58	8.81%	91.11	9.65%
Station 5	7.73	12.22%	106.93	11.33%
Station 6	5.25	8.29%	72.05	7.63%
Station 7	9.88	15.62%	89.06	9.43%
Station 8	3.85	6.09%	86.28	9.14%
Station 9	5.17	8.18%	75.78	8.03%
Station 10	4.20	6.64%	92.98	9.85%
Station 11	7.46	11.79%	123.27	13.06%

Concentration

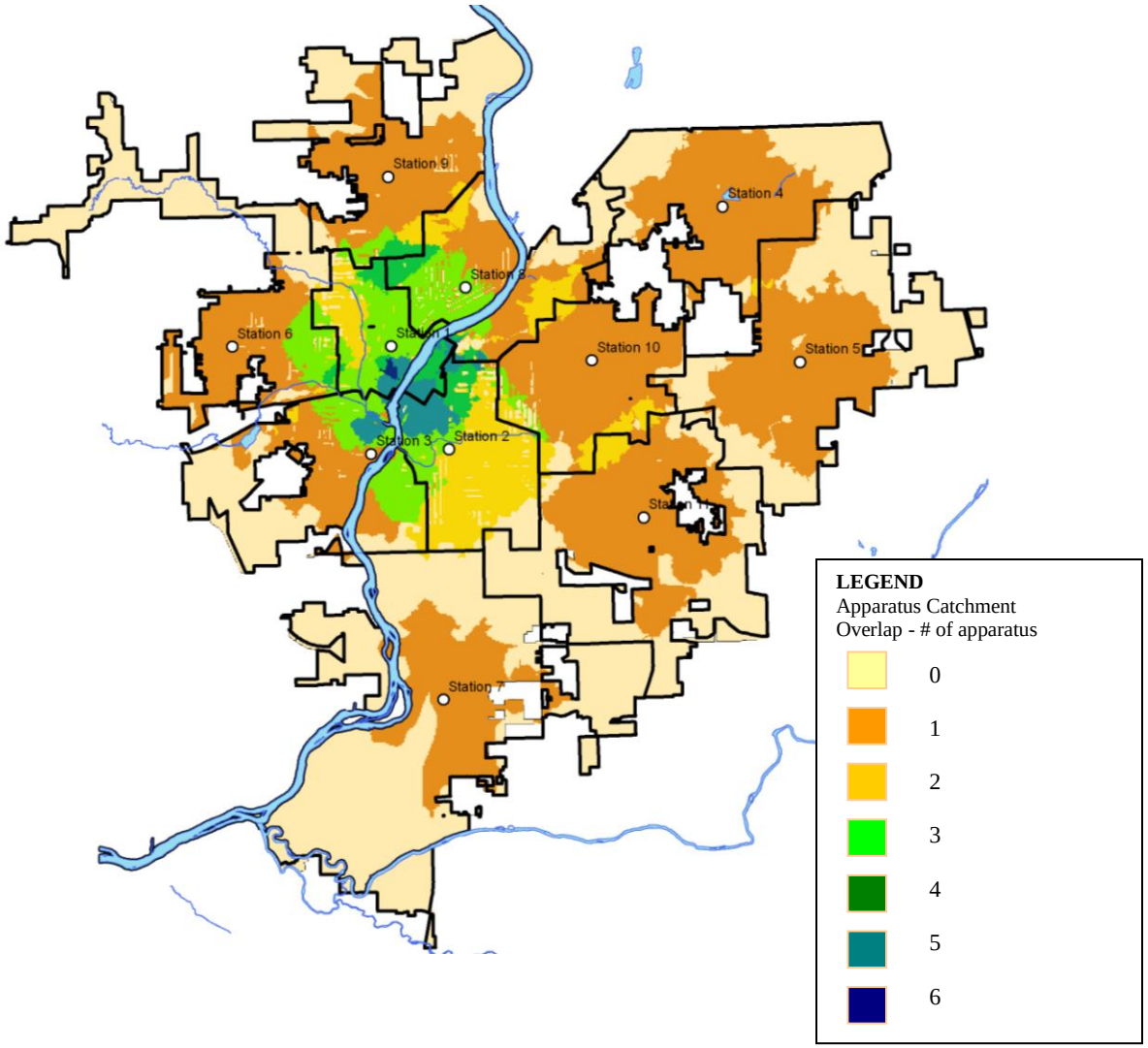
The Department has concentrated stations and apparatus in those areas of the City which have historically shown a higher probability of incident response. Comparison of the following tables with square mileage data from the distribution information above shows that the Department has designed the size of certain still territories and concentration of resources based on incident frequency.

Still Territory	# of Incidents	% of Total	# of Incidents/Square Mile
Station 1	11,225	16.27%	5,231.76
Station 2	11,756	17.04%	3,416.17
Station 3	3,981	5.77%	713.82
Station 4	3,830	5.55%	686.87
Station 5	5,902	8.56%	763.40
Station 6	5,833	8.46%	1,111.47
Station 7	4,596	6.66%	465.02
Station 8	3,557	5.16%	923.30
Station 9	6,346	9.20%	1,226.29
Station 10	5,221	7.57%	1,242.16
Station 11	6,732	9.76%	902.54

Still territories at the core of the City (Stations 1 and 2) are the smallest in area, yet have the highest number of total incidents. In order to provide an effective response force (ERF) in the least amount of time to the highest incident areas, the Department has also placed two fire apparatus and a command officer in each of these stations.

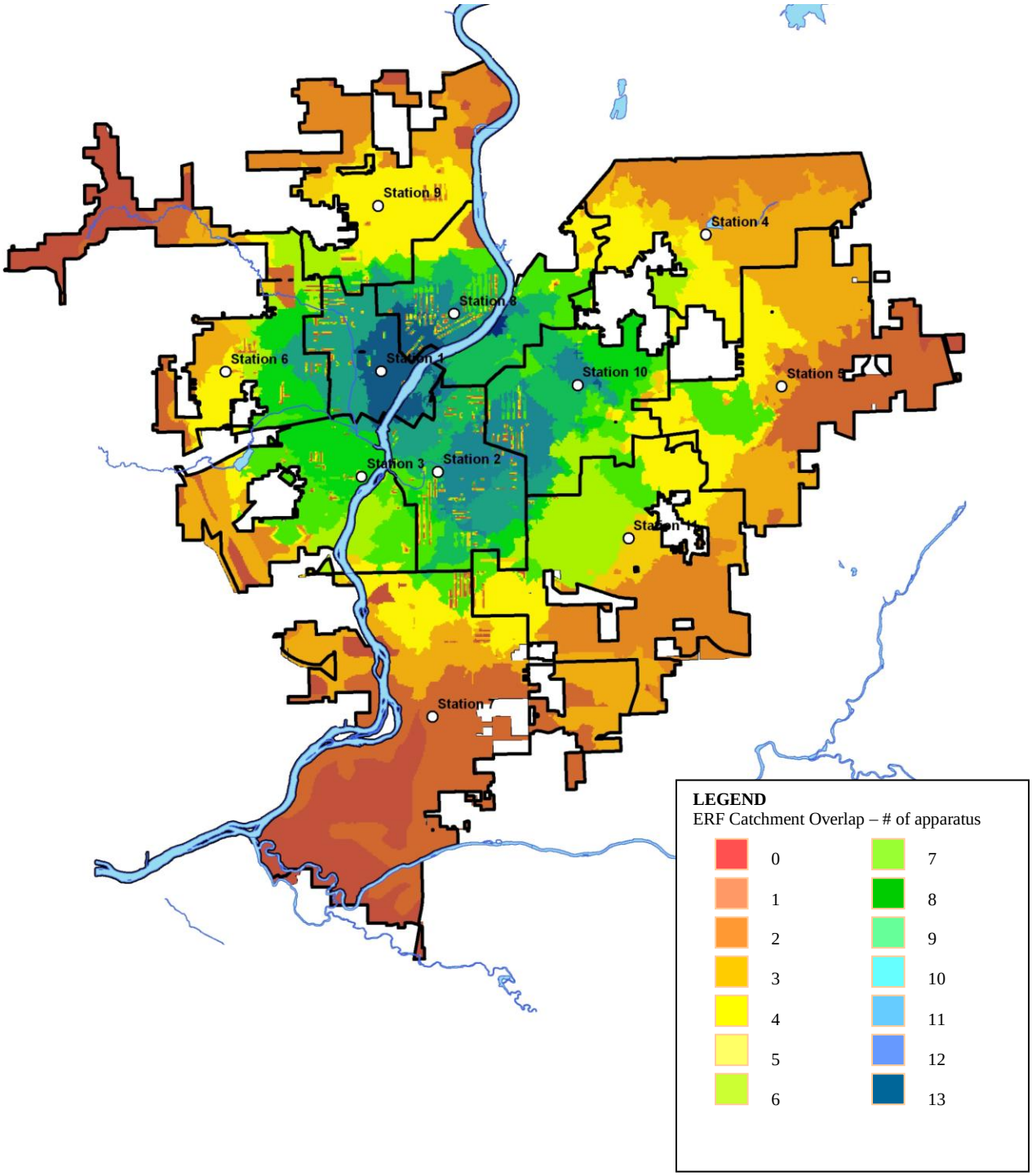
The apparatus catchment overlap map below illustrates how the Department has addressed incident frequency through redundancy of coverage. The map shows the theoretical number of apparatus that can respond to an area of the City within the four-minute travel time benchmark. It is important to mention the method for calculating the catchment areas, and thus the overlap of these areas. The catchment areas are calculated using road miles and 80 percent of the roads' posted speed limit (*ArcUser*, October – December, 2004). The theoretical catchment areas do not account for traffic patterns or infrastructure issues, and only include apparatus that provide personnel who are considered part of the ERF. However, the catchment overlap map below provides a general idea of the amount of apparatus overlap. As discussed in Sections One and Two and as illustrated below, the Department has provided redundancy of coverage along the West State Street/Kishwaukee Street corridor.

Apparatus Four-Minute (Travel Time) Catchment Overlap



The map below illustrates which areas of the City can have an ERF assembled on scene within the theoretical eight-minute travel time benchmark. Again, these maps are calculated based on road miles and 80 percent of the roads' posted speed limit, and only include apparatus that contribute to the ERF.

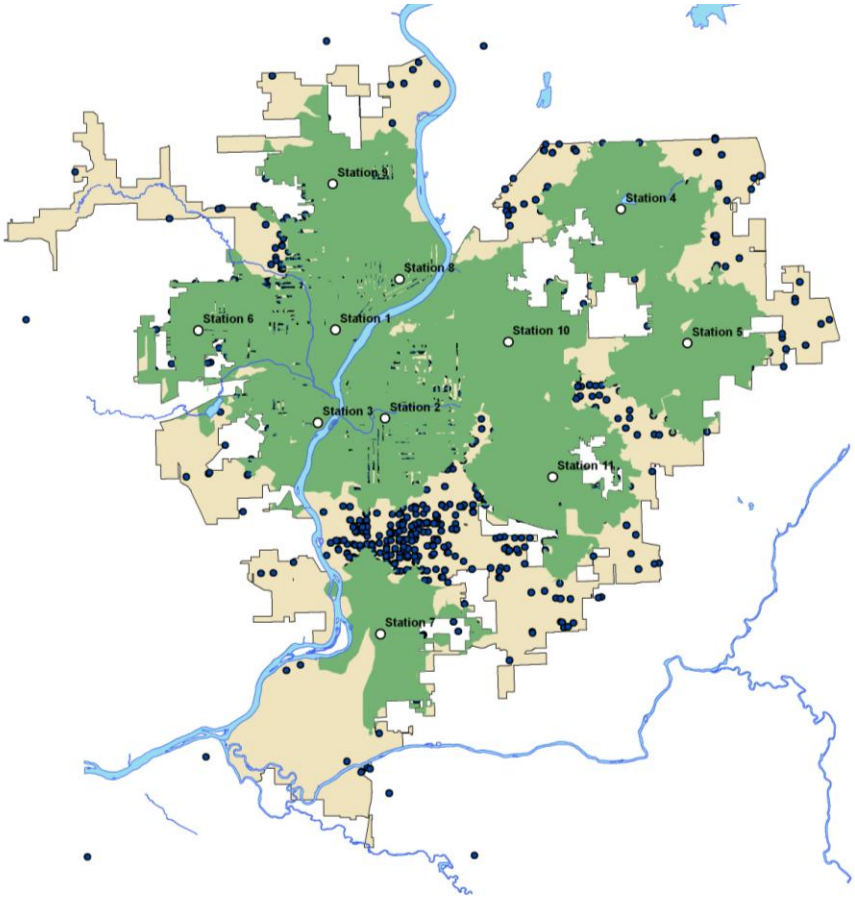
Apparatus Effective Response Force (Travel Time) Catchment Overlap



Reliability

A reliability study of the historical response to incidents demonstrates the Department's attempt to meet initial response time benchmarks (travel time). Again, the major focus of the analysis will be on the travel time component of the overall response time. The Department has illustrated the reliability of the four-minute initial travel times for the City. The following map depicts the theoretical four-minute response (travel time) catchment areas and the fire incidents that fall outside of these catchment areas.

Fire Incidents Outside Four-Minute (Travel Time) Catchment Areas
(July 2006 through June 2009)



The incidents that do not occur within the four-minute catchment areas reveal a resource distribution weakness. There are other areas in which the low incident frequency does not dictate a need for additional resources at this time. The Department will continue to monitor these areas and include them in long-range planning.

The area of immediate concern lies at the confluence of Stations 2, 7, and 11's still territories. As indicated in Section Two, this area has historically had extended travel times combined with a relatively high incident frequency resulting in medium to high range total risk scores for the service zones in this area. The Department must address this situation either through the relocation or addition of resources.

Apparatus may be unavailable or "out of service" for a variety of reasons. In addition to incident commitment, apparatus may be unavailable due to maintenance issues, training sessions, and/or special non-emergency duties. The Department has calculated the percent availability for each still company, and the percentage of non-still company first arrival as shown in the following table.

Fire Incidents				
Still	**# of Incidents**	**Non-Still Co. 1st Arrival**	**% Non-Still Co. 1st Arrival**	**Still Co. % Availability**
Station 1	103	9	10%	91.15%
Station 2	167	16	10%	90.05%
Station 3	84	9	11%	90.39%
Station 4	26	2	8%	91.77%
Station 5	43	3	9%	88.83%
Station 6	120	14	13%	88.38%
Station 7	**102**	**21**	**21%**	**91.08%**
Station 8	**70**	**17**	**26%**	**91.40%**
Station 9	60	9	15%	89.68%
Station 10	**53**	**11**	**21%**	**90.30%**
Station 11	**104**	**20**	**22%**	**88.59%**

In theory, a non-still apparatus should not be the first arriving unit on scene of incidents more often than the still apparatus is unavailable. Analysis of the percent availability of each apparatus, compared with the percent that a non-still apparatus arrives first, for each still territory indicates several still territories where the first due apparatus is not the responding apparatus a large percentage of the time. It is important to note that the Department evaluated all structure fires and vehicle fires, as the fire incidents are predominantly these two incident types. The percentage of non-still apparatus and percentage of still apparatus unavailability should be relatively equal. However, as identified in the above table, Stations 7, 8, 10 and 11 have a disproportionately higher percentage of non-still apparatus arrival.

Further analysis of the incidents where a still apparatus was not the first on scene revealed multiple reasons. The Department analyzed each of these incidents individually and has compared them with other incidents occurring before the actual incident to determine the

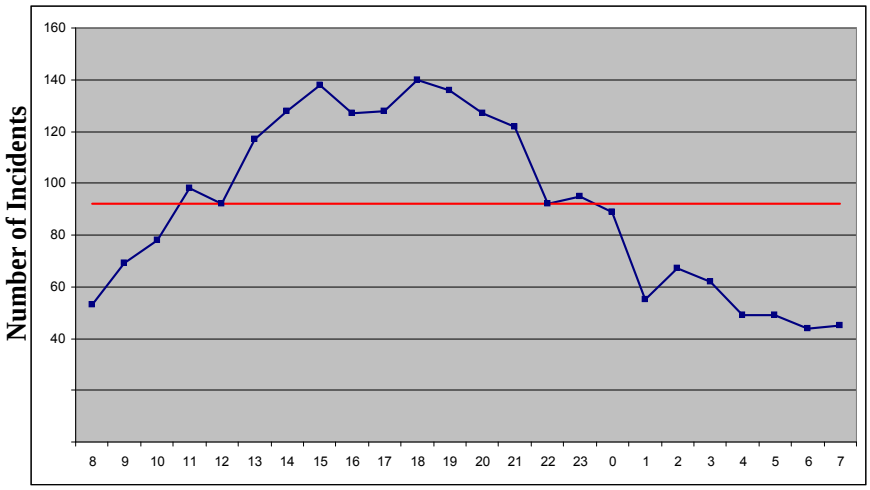
possible cause(s). Because of documentation issues with the current reporting system, each of these incidents was reviewed "by hand" in an effort to ensure accuracy. Again, the Department used the same three-year time period for analysis (July 2006 through June 2009). The following table depicts a percentage breakdown of these incidents:

Still	Non-Still Co. 1st Arrival	% Concurrent Calls	% Beat Into Still	% Other
Station 1	9	100.00%	0.00%	0.00%
Station 2	16	81.25%	12.50%	6.25%
Station 3	9	44.44%	55.56%	0.00%
Station 4	2	50.00%	50.00%	0.00%
Station 5	3	66.67%	33.33%	0.00%
Station 6	14	64.29%	28.57%	7.14%
Station 7	21	61.90%	28.57%	4.76%
Station 8	17	23.53%	58.82%	11.76%
Station 9	9	44.44%	33.33%	22.22%
Station 10	11	9.09%	45.45%	0.00%
Station 11	20	60.00%	25.00%	15.00%

Reasons for non-still apparatus response were due primarily to concurrent calls. As illustrated above, the non-still company first arrival was due to concurrent calls at least 50% of the time for seven of the eleven still territories. In addition to inaccurate time-stamping, there were also calls where the cause could not be determined, other than simply a faster response than the still apparatus. While infrastructure, road construction and apparatus responding from distant areas of their respective still territories all may contribute to the slower still apparatus response, clusters of incidents were found in areas bordered by adjacent still territories, indicating that still reassignment may be necessary for these areas.

The Department has also performed a time of day analysis for fire incidents. At this time the Department is unable to compare the time of day analysis with the concurrent calls for service data due to an inability to correlate the data within the reporting software program. However, the time of day analysis does serve as a guide in terms of apparatus availability and probable resource exhaustion. As indicated by the following graph, the peak period for incidents is between the hours of 1:00pm and 10:00pm.

Time of Day Analysis



Current performance

The Department's service area is largely developed with an average population density of 2,362 per square mile, with greater than 80% of the jurisdiction (page 10) falling within either the metropolitan (greater than 3000 people per square mile) or the urban (2000 to 3000 people per square mile) population classifications as defined by the Commission on Fire Accreditation International (CFAI) in the *Fire and Emergency Service Self Assessment Manual*, 8th ed., pg. 71.

The Department has opted to utilize the NFPA 1710 benchmark of four minutes at the 90th percentile for fire initial response (travel time) and eight minutes at the 90th percentile for fire ERF response (travel time), in conjunction with the CFAI metropolitan/urban credible timeframes of five minutes and 12 seconds at the 90th percentile and for initial response (travel time), and 10 minutes and 24 seconds at the 90th percentile for ERF response (travel time).

The 90th percentile first arrival travel time was 5:05 for the three-year period included in the study. Overall, the Department's baseline time does not meet the NFPA 1710 benchmark of four minutes. However, the Department's baseline time does fall between the NFPA 1710 four-minute travel time benchmark and the CFAI (*Fire & Emergency Service Self Assessment Manual*, 8th ed., pg. 71) credible timeframe of 5:12. Further analysis of the first arrival travel times shows the Department was able to place the first unit on scene within the NFPA 1710 benchmark for 78% of the applicable incidents.

First Arrival Travel Time (Enroute to Arrival) 90th Percentile

	July '06 – June '07	July '07 – June '08	July '08 – June '09	Overall
First Arrival Travel Time	6:00	4:08	4:29	**5:05**

The first arriving apparatus is only one component of the reliability study of apparatus response. The Department also evaluated the full compliment or effective response force (ERF) for all structure fires in the City. As discussed in Section Two, the Department has defined the ERF, in accordance with NFPA 1710, as follows: a minimum of 16 personnel staffing at least two pumping apparatus, an aerial apparatus and any combination of additional apparatus that provide the remaining personnel. This combination of personnel and apparatus addresses the compliment needed to complete all critical tasks as defined in NFPA 1710 and the Department's Standard Operating Procedures. Similar to the first apparatus arrival analysis, the current reporting system is unable to extract ERF response information. Again, these incidents were reviewed "by hand" to ensure accuracy.

The 90th percentile full compliment travel time was 9:25 for all incidents during the three-year evaluation period. Again this baseline time does not meet the NFPA 1710 eight-minute travel time benchmark. However, the times for each individual year as well as the three-year percentile all fall between the NFPA 1710 eight-minute travel time benchmark and the CFAI (Fire & Emergency Service Self Assessment Manual, 8th Ed., pg. 71) credible timeframe of 10:24. As discussed in Section 2, further analysis of the ERF travel times shows the Department was able to place an ERF on scene within the NFPA 1710 benchmark for 80% of the applicable incidents.

ERF Travel Time (Enroute to Arrival) 90th Percentile

	July '06 – June '07	July '07 – June '08	July '08 – June '09	Overall
ERF Travel Time	9:23	10:12	8:32	**9:25**

Summary

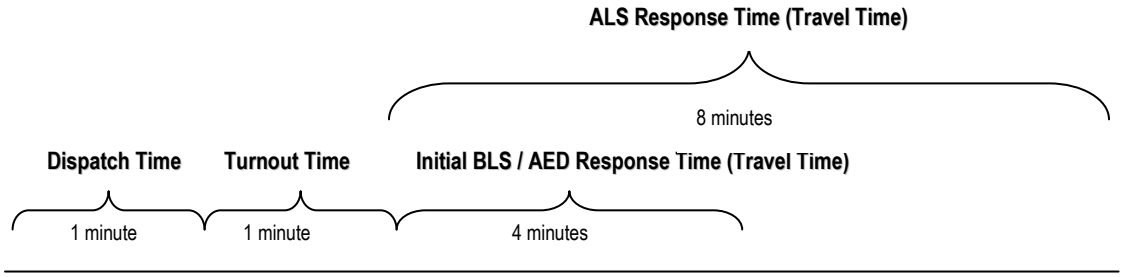
The Department has attempted to evaluate all facets of performance measurement in order to identify both strengths and weaknesses. Major strengths include a generally equal distribution of resources throughout the jurisdiction, redundancy of coverage for higher incident density areas, and a significant percent of apparatus availability. In combination these three elements provide the capacity to deliver service in an effective and efficient manner. Currently, the Department's baseline performance falls between the NFPA 1710 benchmark and CFAI/CPSE credible timeframe.

Areas in which the Department is unable to provide adequate first arrival apparatus response indicate a variety of weaknesses that must be addressed. Infrastructure, excessive still territory size, and resource placement all contribute to increased response times which fall

outside acceptable performance benchmarks. However, the Department does provide an effective response force to all areas of the City within the CFAI/CPSE defined response parameters. Although distribution is considered a strength, it is important to note that in an attempt to distribute resources equally, gaps still exist between the four-minute catchment areas and some fringe areas of the City.

System Performance: Emergency Medical Services

The Department has established a benchmark for medical calls in accordance with NFPA 1710, which specifies a one minute turnout time and basic life support (BLS) response with automatic external defibrillator (AED) to arrive on scene within four minutes, and advanced life support (ALS) response to arrive on scene within eight minutes, 90% of the time. The time continuum below illustrates the Department's benchmark as it relates to NFPA 1221 and NFPA 1710.



Again, it is important to note that the four and eight-minute response (travel times) will be the focus for much of the analysis and performance measurement.

Distribution

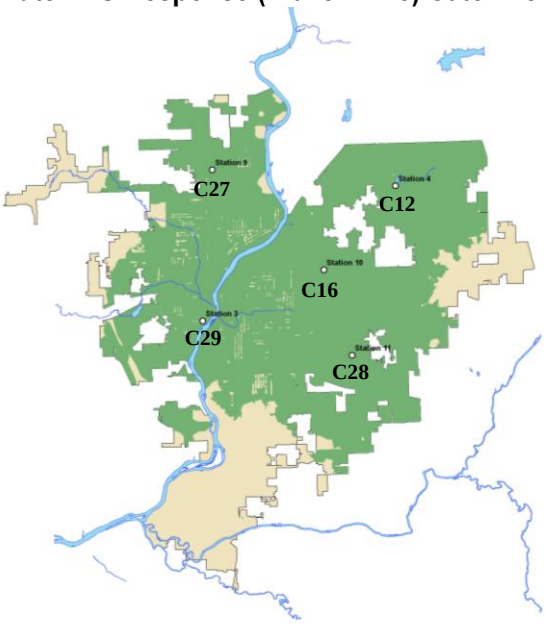
All Department fire apparatus are licensed at the ALS level and equipped with AEDs, and are staffed with a minimum of one EMT-Paramedic and three EMT- Basics. The Department has five ambulances which are all licensed at the ALS level, and are staffed with a minimum of one EMT-Paramedic and one EMT-Basic. The Department's response plan of one fire apparatus (four personnel) and one ambulance (two personnel) addresses the critical tasks identified in Section Two for a medical incident, and adheres to NFPA 1710 for EMS Operations. The response plan also addresses the American Heart Association's guidelines for response to cardiac arrest incidents.

The four-minute catchment areas for EMS incidents are identical to those analyzed for fire incidents (see *Four-Minute Initial Engine Response (Travel Time) Catchment Areas Map*, page 36). In an effort to provide equal distribution for an effective response force (ERF), ambulances have been strategically placed at five different stations throughout the City.

Station #	Fire Apparatus & Ambulance
Station #3	Eng. #3 / C29
Station #4	Eng. #4 / C12
Station #9	Quint #9 / C27
Station #10	Eng. #10 / C16
Station #11	Eng. #11/ C28

The following map illustrates the eight-minute ALS (ambulance) response catchment areas.

Eight-Minute ALS Response (Travel Time) Catchment Areas



Additional ALS transport vehicles supplement the Department's response through agreements with local private ambulance services. The numbers of private ambulance responses for the specified three-year timeframe are listed in the table below.

	July '06 – June '07	July '07 – June '08	July '08 – June '09
Private Ambulance Responses	317	860	1019

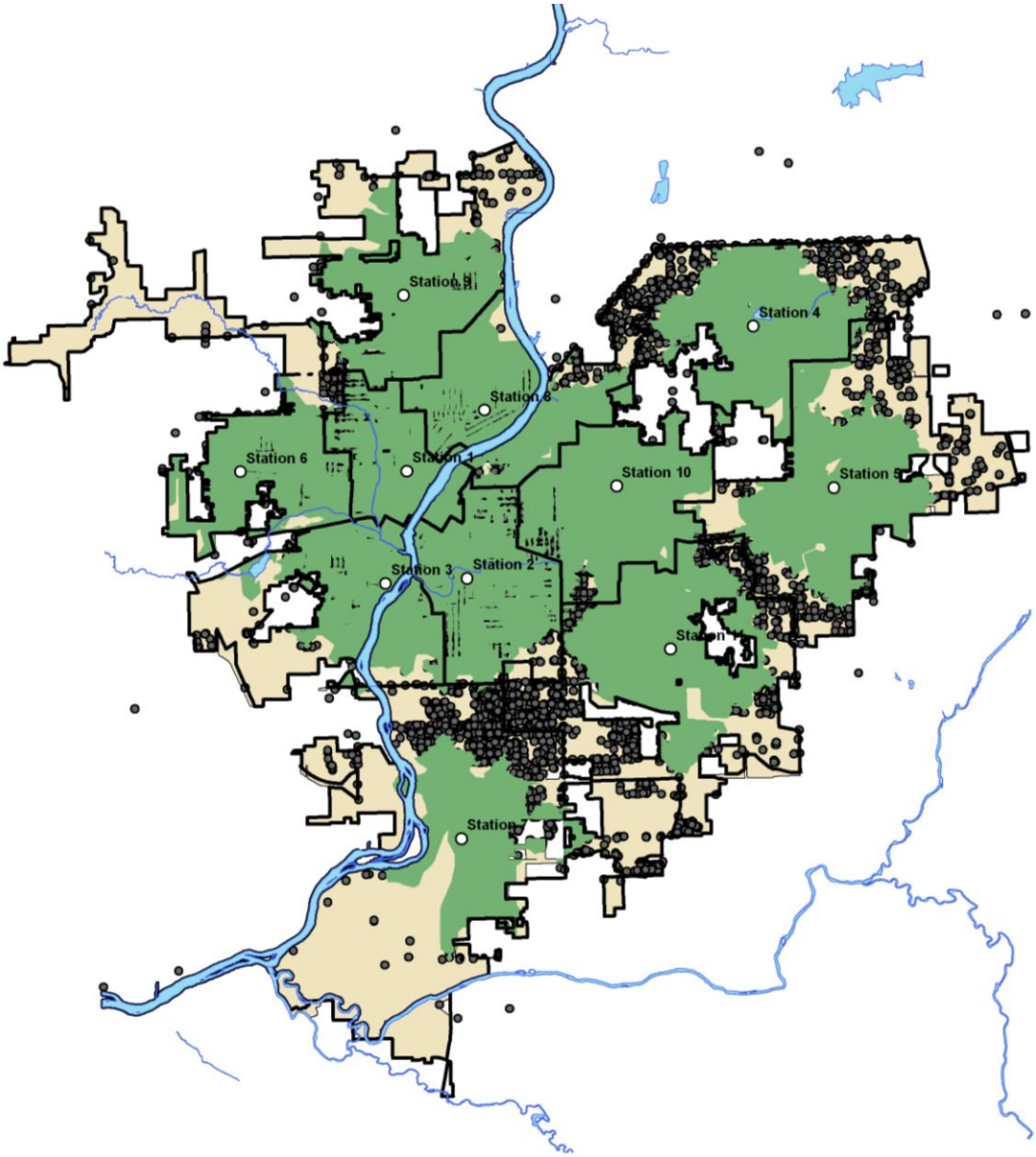
Concentration

The Department's apparatus catchment overlap is the same for non-fire incidents and addresses incident frequency through redundancy of coverage in the same manner (see *Apparatus Four-Minute (Travel Time) Catchment Overlap Map*, page 38). The ambulance still territories are designed to be as equally distributed as possible with only five ambulances, and to encompass the areas of highest frequency. Although the response plan attempts to provide for redundancy of coverage, the ambulances are likely to be away from their respective still territories or on concurrent calls on a very frequent basis. The primary reason for this disparity in the redundancy of coverage for ambulances is the disproportionate relationship between the increase in EMS incidents and the current number of ambulances. Thus, redundancy of coverage for ambulances is an erroneous evaluation tool at this time. However, the Department does augment the ambulance coverage with an ALS first response. As mentioned previously, all fire apparatus are staffed with a minimum of one EMT – Paramedic and three EMT-Basics. Additionally, the Department supplements ambulance coverage through the use of private ambulances.

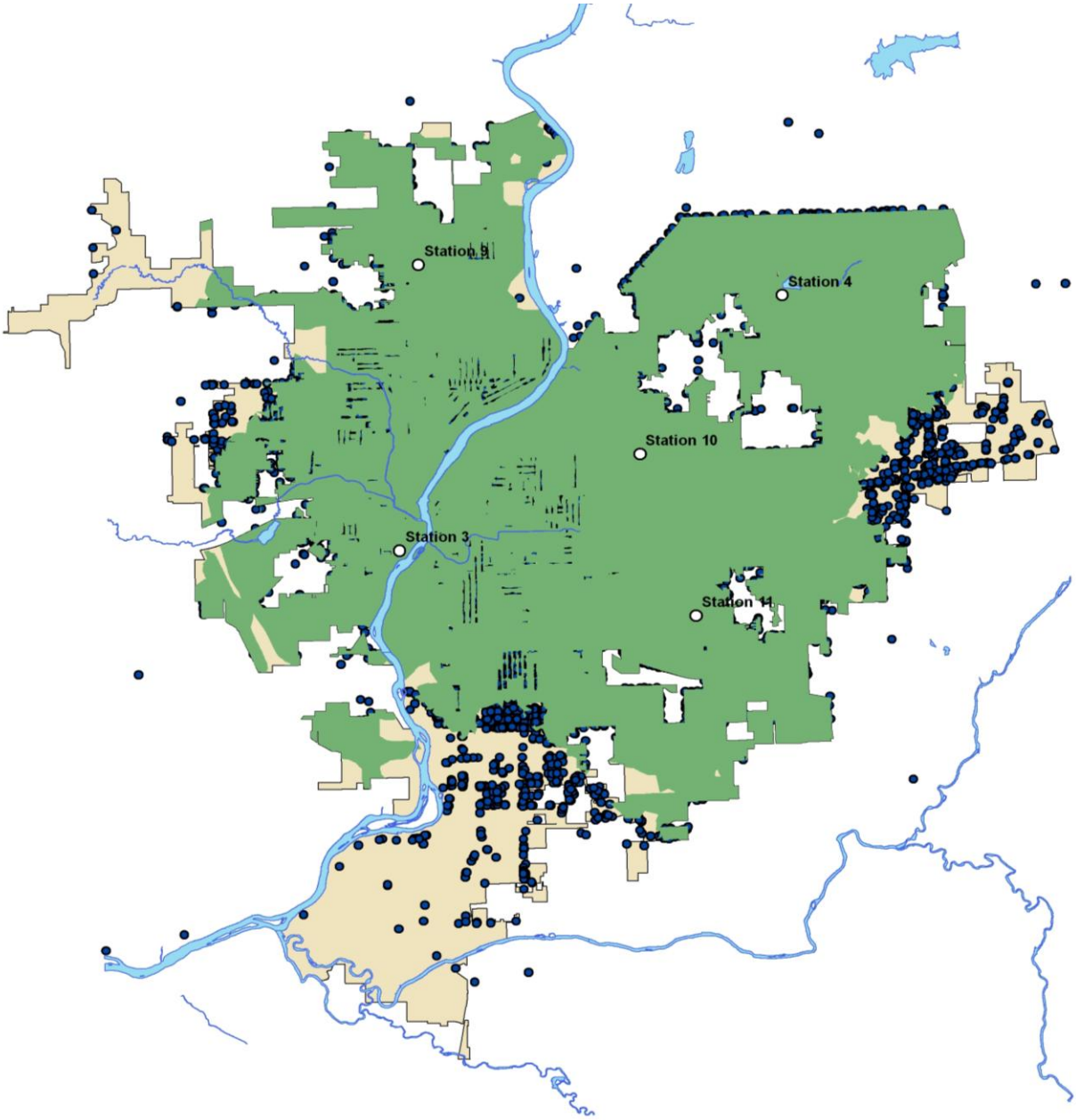
Reliability

As discussed earlier in this section, the Department has illustrated the reliability of the four-minute initial response times for the City, and does not distinguish between fire and non-fire in terms of the four-minute initial response (travel time) benchmark. The following two maps depict the theoretical four-minute and eight-minute response catchment areas, as well as the EMS incidents that fall outside of these catchment areas.

EMS Incidents Outside Four-Minute (Travel Time) Catchment Areas
July 2006 through June 2009



EMS Incidents Outside Eight-Minute ERF (Travel Time) Catchment
July 2006 through June 2009



The Department has calculated the percent availability for each still apparatus, and the percent non-still apparatus first arrival for EMS incidents, as shown in the following table.

Still	# of Incidents	Non-Still Co. 1st Arrival	% Non-Still Co. 1st Arrival	Still Co. % Availability
Station 1	8457	953	11%	91.15%
Station 2	8615	485	6%	90.05%
Station 3	2721	203	7%	90.39%
Station 4	2214	142	6%	91.77%
Station 5	3852	459	12%	88.83%
Station 6	4432	430	10%	88.38%
Station 7	3024	229	8%	91.08%
Station 8	2481	313	13%	91.40%
Station 9	4719	358	8%	89.68%
Station 10	3891	521	13%	90.30%
Station 11	5953	544	9%	88.59%

Unlike the Department's fire first response analysis, the EMS first response does not show a disproportionate relationship between still company availability and still company first arrival for any of the station still territories. In an effort to further analyze reliability, the Department plotted the EMS incidents in which the first arrival company's travel time exceeded four minutes for each still territory (see Appendix 3A).

The individual still territory maps show clusters of incidents for Stations 4, 6, 7 and 11 where the initial response times exceeded the four minute travel time benchmark. The clusters present in Stations 7 and 11 still territories match those identified for fire response, and also appear on the *EMS Incidents Outside Four-Minute (Travel Time) Catchment Areas Map* (page 48). As discussed in the system performance for fire, the Department must consider resource addition or redistribution in order to address this situation.

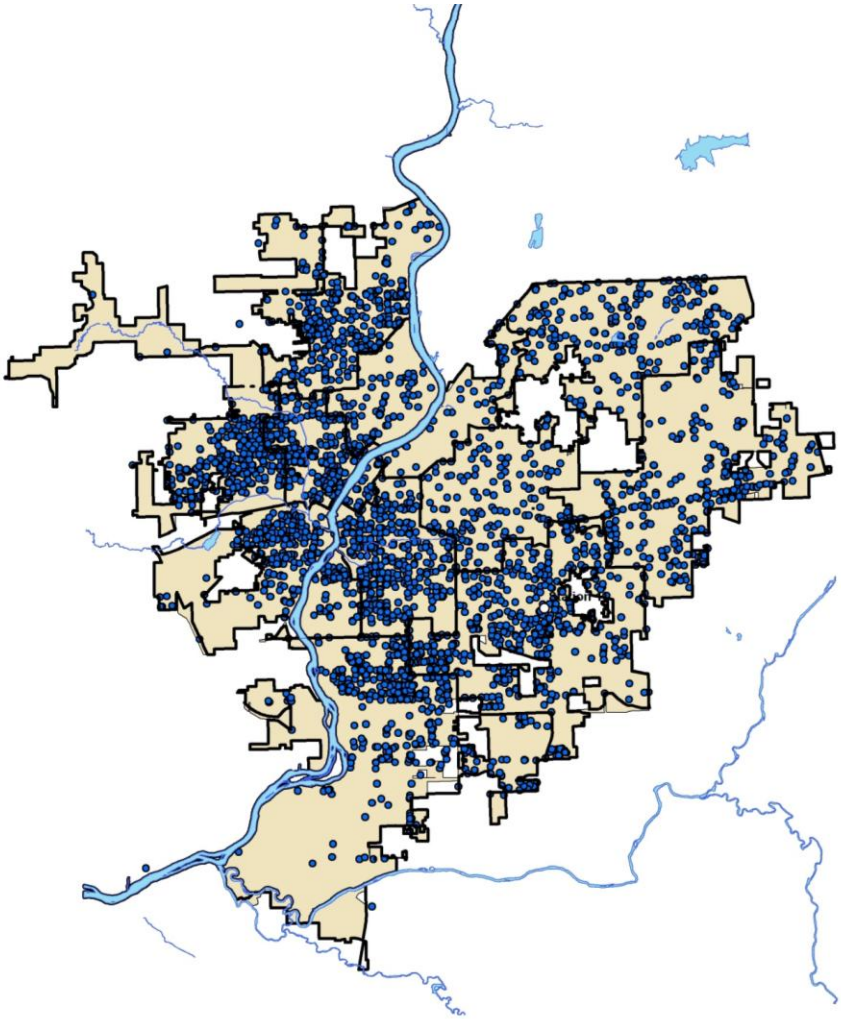
The cluster of incidents present in the northwestern area of Station 4's still territory is primarily due to poor infrastructure. This particular area of Station 4's still territory is mostly residential with very few main thoroughfares. Additionally, most of the roads in this area are not directionally parallel or perpendicular and contain an enormous amount of curves and bends, thus posing access issues for Engine 4.

The cluster of incidents present along the eastern edge of Station 6's still territory is primarily caused by training. Station 6 houses both the Recruit Training Academy and serves as the Department's training facility. As a result Engine 6 is out of service and unavailable a disproportionate amount of time, particularly during the peak incident time period. The

Department has reviewed this issue in the past and considered several options to resolve it, including hiring off-shift personnel to conduct training and temporarily relocating a company during training sessions. However, each of these options creates an additional set of issues. That is, relocating a company would create an unprotected still territory elsewhere in the City, and the current financial climate inhibits the hiring of overtime personnel for all training sessions.

As discussed in critical tasking (Section 2) for an EMS incident, the Department considers an ERF to be the arrival of both a fire apparatus and an ambulance. The following map and table indicate the number of incidents that exceeded the eight-minute ERF travel time for each apparatus still territory.

EMS Incidents – ERF Travel Time Over 8 minutes – Still Territories
July 2006 through June 2009
(13,363 Incidents)



Still Territory	EMS Incidents > 8 min. July '06 – June '09
Station 1	511
Station 2	564
Station 3	417
Station 4	393
Station 5	515
Station 6	509
Station 7	638
Station 8	170
Station 9	584
Station 10	204
Station 11	624
TOTAL	**13,363**

Because the Department's EMS ERF includes the arrival of both a fire apparatus and an ambulance, the Department examined ambulance data, to include the number of incidents per ambulance and ambulance reliability, as a single component of the EMS ERF response. The following tables, respectively, list the number of incidents per ambulance and the percent availability for each of the Department's five ambulances as compared to the percent of non-still ambulance company first arrival.

Unit	July '06 – June '07	July '07 – June '08	July '08 – June '09	Total
RC12	2,957	3,165	3,047	9,169
RC16	2,996	3,719	3,599	10,314
RC27	3,244	4,520	4,436	12,200
RC28	3,111	3,775	3,766	10,652
RC29	3,740	4,578	4,576	12,894
Total	16,048	19,757	19,424	55,229

Ambulance Still	# of Incidents per Still	Non-Still Amb. 1st Arrival	% Non-Still Amb. 1st Arrival	% Still Amb. Availability
C12 / Station 4	**8023**	**3513**	**43.79%**	**69.55%**
C16 / Station 10	5950	2225	37.39%	67.53%
C27 / Station 9	14120	5569	39.44%	60.98%
C28 / Station 11	8121	2907	35.80%	64.55%
C29 / Station 3	11038	4502	40.79%	58.15%

Again, a non-still ambulance should not be the first arriving unit on scene of incidents more often than the still ambulance is unavailable. Analysis of the percent availability of each ambulance, compared with the percent that a non-still ambulance arrived first, for each ambulance still territory only revealed a discrepancy within one still territory. As indicated in the above table, C12/Station 4 has a disproportionately higher percentage of non-still ambulance first arrival. Analysis of the data does not provide any identifiable reason(s) for this discrepancy.

Current Performance

As with the system performance for fire response, the Department has approached EMS performance with identical time measures: NFPA 1710 benchmark of four minutes at the 90th percentile for EMS initial response (travel time) and eight minutes at the 90th percentile for EMS ERF response (travel time), in conjunction with the CFAI metropolitan/urban credible timeframes of five minutes and 12 seconds at the 90th percentile and for initial response and 10 minutes and 24 seconds at the 90th percentile for ERF response.

The 90th percentile first arrival travel time was 5:16 for the three years included in the study. Overall, the Department's baseline travel time does not meet the NFPA 1710 benchmark of four minutes or the CFAI (Fire & Emergency Service Self Assessment Manual, 8th Ed., pg. 71) credible timeframe of 5:12. However, as illustrated below the two most recent years' times fall between the NFPA 1710 benchmark and the CFAI credible timeframe. Further analysis of the first arrival travel times shows the Department was able to place the first unit on scene within the NFPA 1710 benchmark for 74% of the applicable incidents.

EMS First Arrival Travel Time (Enroute to Arrival) 90th Percentile

	July '06 – June '07	July '07 – June '08	July '08 – June '09	Overall
First Arrival Travel Time	6:00	4:43	4:48	**5:16**

The first arriving apparatus is only one component of the reliability study of apparatus response. The Department also evaluated the full compliment or effective response force (ERF) for all EMS incidents in the City. As discussed in Section Two, the Department has defined the ERF, in accordance with NFPA 1710, as follows: one fire apparatus (four personnel) and one ambulance (two personnel) to include a minimum of two paramedics and four EMT-Basics. The Department's response plan addresses the critical tasks identified in Section Two for a medical incident, and adheres to NFPA 1710 for EMS Operations.

The 90th percentile full compliment travel time was 8:09 for all incidents during the three-year evaluation period. Again this baseline time does not meet the NFPA 1710 eight-minute travel time benchmark. However, the times for each individual year as well as the three-year percentile all fall between the NFPA 1710 eight-minute travel time benchmark and the CFAI (Fire & Emergency Service Self Assessment Manual, 8th Ed., pg. 71) credible timeframe of

10:24. Further analysis of the ERF travel times shows the Department was able to place an ERF on scene within the NFPA 1710 benchmark for 89% of the applicable incidents.

EMS ERF Travel Time (Enroute to Arrival) 90th Percentile

	July '06 – June '07	July '07 – June '08	July '08 – June '09	Overall
EMS ERF Travel Time	7:00	8:31	8:48	**8:09**
Rockford Fire Ambulances	7:20	8:19	8:36	**8:03**
Private Ambulances	10:56	12:43	12:30	**12:32**

Although the Department's EMS ERF travel time baseline is within an acceptable range, the trend of increasing incidents over the three year evaluation period has a correlating effect on the first arrival travel times as well as the ERF travel times. Currently, the data shows a low percent of ambulance availability (less than 70%) for each of the Department's five ambulances, as well and an increase in private ambulance usage. The dramatic difference in response times (an approximate 50% increase) between Department ambulances and private ambulances will continue to increase the first response and ERF travel times.

Summary

The Department's three year analysis of EMS incidents shows both areas where performance meets credible criteria and those where improvement is needed. Strategically located ambulances attempt to provide equal distribution to all areas of the City. The Department's EMS response plan for first arrival apparatus and redundancy of coverage are identical to those for fire incidents and provide the same strengths. The two most recent years' response data fall between the benchmark and credible timeframe for both the first arrival apparatus and ERF. Additionally, ALS-staffed first response apparatus assure an increased level of care to the community.

The consistent increase in incidents throughout the jurisdiction without a proportionate number of ambulances has created a strain on the ability to provide a timely EMS response. The number of private ambulance responses into the City more than tripled over the three-year evaluation period. This fact, coupled with the extremely extended private ambulance response times, will continue to negatively impact the Department's EMS performance measures. Additional Department ambulance(s) will be necessary in order for the Department to continue providing an EMS ERF based on equal distribution to all areas of the City.

System Performance – Specialty Services

Additional non-fire response includes technical rescue, as defined by CFAI (*Fire and Emergency Services Self-Assessment Manual*, 8th Edition, Criterion 5E, pg. 92), airport rescue fire fighting - ARFF (*Fire and Emergency Services Self-Assessment Manual*, 8th Edition, Criterion 5I, pg. 95), and hazardous materials (*Fire and Emergency Services Self-Assessment Manual*, 8th Edition, Criterion 5F, pg. 92).

Although CFAI uses technical rescue to encompass several specialty services, the Department has separated the category into extrication, water rescue, and specialized rescue/technical rescue (TRT) in an effort to determine the baseline response performance for each. Water rescue was examined based on the Department's defined response for lakes (six apparatus) and rivers (eight apparatus). Airport Rescue Fire Fighting (ARFF) was examined based on the Department's defined response for ARFF incidents for Alert 2 (six apparatus) and Alert 3 (ten apparatus) responses – Alert 1 responses were eliminated because these units do not respond in emergency mode. The only hazardous materials incidents examined were those that identified a known or unknown product on the initial dispatch and/or resulted in an actual product release. Because the hazardous materials team is not considered part of the response for carbon monoxide incidents and natural gas leak/odor incidents, these incident types were excluded in determining the hazardous materials baseline response performance.

The Department analyzed travel times over the same three-year time period (July 2006 through June 2009) for each of these areas to determine baseline performance for both first arrival and ERF categories, where applicable. The following table shows the 90th percentile times for each specialty.

Specialty	# of Incidents	1st Arrival	ERF
Extrication	61	5:18	8:09
Water (Total)	53	6:55	NA
- Lakes	12	6:39	14:11
- River	9	3:49	19:16
Specialized Rescue (TRT)	0	NA	NA
ARFF			
- Alert 2	7	5:00	6:07
- Alert 3	1	0:09	9:11
Hazardous Materials	17	3:44	13:10

Summary

Because there are no industry-wide response time standards concerning specialty services, the Department is unable to evaluate overall performance. Since still apparatus are dispatched for all emergencies in the same manner, the first arrival data for specialty services should reflect travel times similar to that for fire and EMS. As shown in the above table, first arrival travel times vary considerably between the different specialties, with most exceeding both the NFPA 1710 benchmark and the CFAI/CPSE credible timeframes. Due to the infrequent number of responses involving a specialty service(s), it is difficult to determine the cause of the discrepancy.

Comparability

Regional Comparables

Due to a wide variety of community factors such as demographics, infrastructure, risks and community size it is difficult to see an equal comparison between communities. Additional fire service-specific factors such as apparatus type, response compliment and services provided further complicate any attempt to compare one community or fire department with any other.

The Department has assembled the following data from regional cities served by career fire departments.

2008	Rockford	Aurora	Elgin	Joliet	Peoria
Area (square miles)	64	42	38	63	50
Population	151,200	176,413	104,000	145,800	115,000
Population Density/square mile	2362	4200	2737	2314	2300
Fire Department Budget	$38,260,069	$34,616,000	$17,321,335	$24,410,044	$17,842,210
Fire Loss	$4,943,913	$3,740,101	$4,096,486	$3,586,570	$1,974,135
EAV	$2,100,181,467	$4,061,000,000	$2,403,562,228	$2,295,776,321	$1,945,751,863
Fire Loss/EAV	$0.0024	$0.0009	$0.0017	$0.0016	$0.0010
ISO Rating	2	2	3	3	2
# Incidents **	23,636	16,336	11,394	16,342	13,070
Fire	241	363	204	147	301
EMS	19,744	11,819	7,897	15,372	8,853
# of Personnel	252	207	132	207	216
Firefighters/1000	1.67	1.17	1.27	1.42	1.80
# of Stations	11	12	7	9	12
Stations/square mile	0.17	0.29	0.18	0.14	0.24
Pumping Apparatus	11	9	7	8	9
Pumping Apparatus/square mile	0.17	0.21	0.18	0.13	0.18
Aerials	5	3	2	3	4
Aerials/square mile	0.08	0.07	0.05	0.05	0.08
Ambulances	5	6	6	9	0
Ambulances/square mile	0.08	0.14	0.16	0.14	0.00
EMS incidents/ambulance (average)	3949	1970	1316	1708	NA

** Total incidents include "Other" incidents (Hazmat, Rescue, Service, etc.)

Most of the categories in the above table demonstrate a mix of data between the various communities, with some communities measuring higher in certain areas and lower in others. The three most obvious service demand variations for the Rockford Fire Department in

contrast with the other communities are the total number of incidents, the number of ambulances per department - thus the number of ambulances per square mile, and the average number of EMS incidents per ambulance. By comparison the larger number of incidents coupled with the lower number of ambulances indicate both probable distribution and concentration issues that should be addressed by the Department.

Accredited Comparables

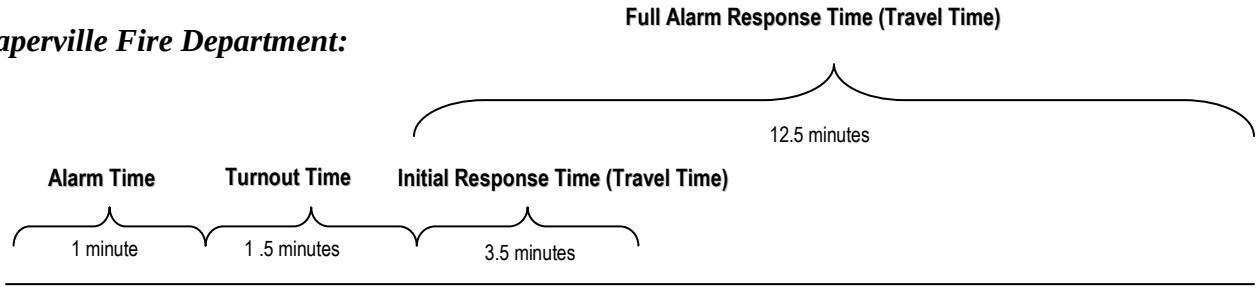
The Department further evaluated comparability with two CFAI/CPSE accredited departments, and selected the Naperville Fire Department, Naperville, Illinois and the Lincoln Fire and Rescue, Lincoln Nebraska for the comparison. As a western suburb of Chicago, Naperville, Illinois is considered a regional community to the City of Rockford, and the Lincoln Fire and Rescue has previously used the Rockford Fire Department in its own comparability study.

Naperville Fire Department

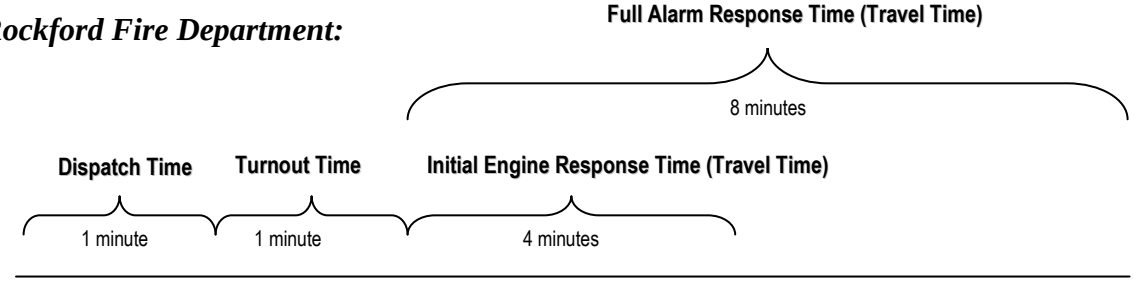
Again, differences in size, services provided, and response criteria make an "apples to apples" comparison difficult. For instance the Naperville Fire Department considers 15 personnel an effective response force (ERF), while the Rockford Fire Department adheres to the NFPA 1710 defined ERF of 16 personnel. This seemingly slight difference accounted for an additional apparatus on scene for the Rockford Fire Department, and consequently extended the ERF travel time in several of the reviewed incidents.

Another important distinction to note regarding performance measurement compared with the Naperville Fire Department is that the evaluated response times are based on independently developed performance targets and the percentage at which they reach those targets, as opposed to a percentile measurement of the response times. The Naperville Fire Department also measured the overall response time, whereas the Rockford Fire Department evaluated the travel time component of the overall response time as a percentile measurement. Additionally, as illustrated below, the Naperville Fire Department defines their overall response time differently than the Rockford Fire Department and NFPA 1710.

Naperville Fire Department:



Rockford Fire Department:



The Naperville Fire Department used 85% as their benchmark for measurement and the Rockford Fire Department used the 90th percentile measurement of the four and eight minute travel times, respectively for initial and ERF response as specified by NFPA 1710. In an effort to adequately compare both agencies, the Rockford Fire Department also calculated the percent reliability for the benchmark measurements.

	Initial Response % Reliability	ERF Compliment	ERF % Reliability
Naperville	82% @ 6:00 overall response time	15pp	88% @ 15:00 overall response time
Rockford	78% @ 4:00 travel time	16pp	80% @ 8:00 travel time

Naperville data shows 82% reliability on a first unit response time (alarm, turnout, and travel) of six minutes, Rockford shows 78% reliability of the NFPA 1710 travel time of four minutes. Naperville shows 88% reliability on an ERF response time of 15 minutes, Rockford shows 80% reliability of the substantially shorter NFPA 1710 standard of eight minutes travel time.

Lincoln Fire and Rescue

The Lincoln Fire and Rescue prioritizes EMS incidents into five different categories, each of which has a different travel time benchmark. Additionally, only the travel times for the two highest priority incident types, out of the five different categories, are included in their data. Unlike the Lincoln Fire and Rescue's distinction between different EMS incidents, the Rockford Fire Department's response plan does not differentiate between EMS incidents in terms of expected travel or response times. Therefore, all EMS incidents were evaluated against the same travel time benchmarks.

Lincoln Fire and Rescue's data is more easily compared. Lincoln does measure their performance as compared to NFPA 1710 at four minutes travel time for initial response and eight minutes travel time for ERF response. Again, in an effort to adequately compare both agencies, the Rockford Fire Department also calculated the percent reliability for the NFPA 1710 benchmarks for travel time.

	Initial Response % Reliability @ 4 minutes	ERF % Reliability @ 8 minutes
Lincoln		
• Fire	90%	89%
• EMS	87%	90%
Rockford		
• Fire	78%	80%
• EMS	74%	89%

It is important to note that Lincoln Fire and Rescue's date spans a five-year period, whereas the Rockford Fire Department's data spans a three-year period. It was also difficult to identify which unit completed the ERF response for Lincoln's travel time measurement.

Again, comparability with other accredited agencies was very difficult, as different agencies, jurisdictions, municipalities, communities, etc. have a wide variation and interpretation in the methodology for collecting and examining pertinent data.

Summary

In effort to measure the performance in all areas of the Department, data was collected through several different avenues. Response data was gathered from the computer-aided dispatch system and Firehouse reporting software. Additionally, GIS software was used to plot catchment and catchment overlap areas, as well as incident frequency by still territory. Because the current reporting system was unable to identify an effective response for fire, all fire incidents were reviewed "by hand" to ensure accuracy.

The Department established the system performance overall benchmark as defined by NFPA 1710 at six minutes for first arriving apparatus and ten minutes for an effective response force. As recommended by CFAI/CPSE, reliability was evaluated on the travel time component of each of the response benchmarks. The effective response force was based on the critical tasking as specified by NFPA 1710. The Department also evaluated travel time performance against the CFAI/CPSE credible timeframes for the metropolitan/urban population density classifications.
Travel time performance was evaluated individually for fire, EMS and specialty response.

Percentile time measurement for fire and EMS did not meet the NFPA 1710 benchmark. Fire response did meet the CFAI/CPSE credible timeframes for both first arrival apparatus and effective response force. Due to extended response times for the first year of the study, EMS initial response times did not meet the CFAI/CPSE credible timeframe for the three-year period. However, EMS initial response times did meet the CFAI/CPSE credible timeframe for the two most recent years in the study.

The Department concluded that redundancy of coverage is addressed very well along high incident frequency areas. The initial response for fire revealed that even in areas where a still apparatus was not the first arriving unit, the response times fell between the NFPA 1710 benchmark and the CFAI/CPSE credible timeframe. Overall resource distribution has been designed to attempt equal coverage to all areas of the jurisdiction.

Additionally, the Department offers specialty rescue services to address known or anticipated community hazards. Although there are no response time industry standards for specialty services, the Department has analyzed each of its specialty areas in order to establish baseline performance.

Catchment area analysis revealed several gaps in coverage throughout the jurisdiction. The Department identified the major causes for these gaps; to include resource distribution in certain areas of the City, infrastructure issues, excessive still territory size, and resource availability. The increased use of private ambulances to augment services to the community has had a negative impact on the overall response time performance for the Department's EMS effective response force.

A comparability study identified glaring differences regarding the delivery of EMS among the different communities, most notably the average number of incidents per ambulance. The Department ambulances average twice as many incidents as those in other communities. Whether comparing like-sized communities or accredited agencies, an equivalent analysis of performance measurement is problematic due to wide variation in methodology.

The completion of risk assessment, data collection, and performance measurement has provided a foundation for developing performance objectives. In an effort to improve service to the community, the Department has utilized the current information to identify both strengths and weaknesses. Continued improvement requires that the Department establish and finalize concrete performance objectives that parallel both organizational goals and industry standards. Section Four identifies these objectives, allowing the Department to perform an actual measurement of expected outcomes.

Section Four: Performance Measures Objective Adoption

Introduction

The previous sections of this Standards of Cover have been historic in nature - the services provided by the Department, the methodology behind these services, and the performance level at which these services have been provided. This section will establish the performance objectives for future service delivery by the Department.

Several factors affect the process of setting measurable objectives including: the community expectations identified early in the accreditation program, risks identified in the risk analysis, scientifically supported incident events, resource availability, and national standards and laws that affect the fire and EMS industry.

The Citizens Advisory Group was clear about their expectations for services provided by the Department. Their five highest ranked categories - EMS, fire, basic rescue, advanced rescue, and hazardous materials mitigation - are each areas where performance is time sensitive and measurable.

The risk matrix created by the Department coupled with the service zone system allows for resource allocation and location decisions. Areas of high incident activity and below benchmark performance have been identified in both fire and EMS categories.

The primary time-critical event at fire incidents is flashover. As defined by the International Fire Service Training Association (IFSTA) flashover is the point at which "the temperature in a compartment results in the simultaneous ignition of all the combustible contents in the space."[1] Flashover is the stage that initial fire ground operations are designed to prevent. Practically speaking, once a fire has reached flashover the incident expands to the entire structure and virtually eliminates the possibility of victim survival. Most sources explain that flashover will occur between eight and ten minutes after the start of a structure fire, depending upon the materials and contents contained within the structure. If water can be applied to the fire room before flashover occurs, the exponential expansion of the incident can be prevented and viable victims can be rescued.

The time-critical event at EMS incidents is biological or brain death. As defined by MosbyJems biological death is the "state of sustained oxygen deprivation after which recovery without brain damage is unlikely."[2] Biological death is the event that medical operations are designed to prevent. Whether due to trauma, respiratory arrest, or cardiac arrest - biological death occurs between eight and ten minutes after adequate oxygen is denied to the brain causing irreversible brain damage. If effective cardio-pulmonary resuscitation and

[1] International Fire Service Training Association (IFSTA), *Essentials of Firefighting and Department Operations*, 5th edition, pg. 120.

[2] MosbyJems. *EMT Prehospital Care*, 3rd edition, pg. 109

cardiac defibrillation can be provided before brain death occurs, the patient has a greater chance for survival.

A recent local incident exemplifies the importance of a timely arrival of an effective response force to the scene of an incident. On December 5, 2009 at 2:19 a.m., units were dispatched to a possible residential structure fire in the southeast quadrant of the City. The first unit arrived on scene within five minutes of the initial dispatch to find a one-story residential structure with fire showing from the front of the building. A bystander on scene informed personnel that there was an 84 year-old victim located in the front bedroom of the residence.

The first apparatus on scene began rescue operations and deployed a pre-connect hose line. Additional apparatus and personnel arrived to establish an effective response force within 8:23 of the initial dispatch of the incident. Due to incident conditions and priorities, seven personnel were dedicated to victim rescue which took more than eight minutes from the initial apparatus arrival on scene. Because of the amount of resources and the number of personnel on scene, it was possible to simultaneously address incident critical tasks while rescue operations were underway, which resulted in the successful rescue of the occupant and damage confined to one half of the structure.

Rescue operations are designed to remove victims from the immediate hazard and deliver them to medical personnel before death or further injury occurs. Hazardous materials operations are designed to prevent an expansion of the incident by either preventing the release of the material or containing it to the area that has already been contaminated.

Time is a major factor in each of these incident types. Both legislators and the courts have recognized the importance of time and allowed emergency service providers to utilize certain privileges in an effort to respond in a safe but expeditious manner. The Department has distributed resources in an effort to provide a timely response to all areas of the jurisdiction. The response plan is designed to place an effective response force on the scene of all incidents within a practical timeframe. The NFPA and CPSE/CFAI have established response time standards for emergency services that are based on scientific data and reasonable expectations. Emergency operations are prioritized, training is conducted, and tactics are utilized - all in an effort to respond to incidents within a timeframe that will prevent the loss of life.

Emergency service providers have a responsibility to attempt to meet applicable standards, laws, and regulations. The fire service must adhere to the Occupational Health and Safety Administration's (OSHA) requirements regarding breathing apparatus and the number of firefighters on scene. Personnel have a duty to act in a manner that satisfies their level of licensure and an organization's mission statement and goals. The legal concept of sovereign immunity has been, and continues to be, eroded by the courts. It is imperative that legal issues be considered by departments, organizations, and jurisdictions when making service decisions.

Performance Goal

In order to establish relevant performance objectives, it is important to recognize the source for such measurement. The Department has established performance benchmarks in accordance with the mission statement and industry standards.

> "It is the mission of the Rockford Fire Department to protect the lives and property of the citizens of Rockford from fire, disasters (natural or manmade), terrorist threats, hazardous materials and other emergencies including emergency medical care. Our mission is accomplished by providing "Excellence in Services" in the areas of prevention, education, suppression, advanced life support care and other public safety emergency services to all areas and citizens of our community."

The Department's performance has been measured against the NFPA 1710 travel time benchmark of four minutes at the 90th percentile for fire initial response and the travel time benchmark of eight minutes at the 90th percentile for fire ERF response, as well as with the CFAI metropolitan/urban credible timeframes of five minutes and twelve seconds at the 90th percentile for initial response, and ten minutes and twenty-four seconds at the 90th percentile for ERF response.

The Department's **baseline** performance objectives have been written to encompass the **total** response time as designated by CFAI/CPSE at **seven minutes and twelve seconds** with one minute for dispatch, one minute for turnout time, and **five minutes and twelve seconds** for initial response time (travel time); and the total full alarm response time baseline at **twelve minutes and twenty-four seconds** with one minute for dispatch, one minute for turnout time, and **ten minutes and twenty-four seconds** for full alarm response (travel time).

The Department's **benchmark** performance objectives have been written to encompass the total response time as designated by NFPA 1710 at **six minutes** with one minute for dispatch, one minute for turnout time, and **four minutes** for initial response time (travel time); and the total full alarm response time benchmark at **ten minutes** with one minute for dispatch, one minute for turnout time, and **eight minutes** for full alarm response (travel time).

Performance Objectives

As described in Section Three, first arrival apparatus response is primarily a measure of distribution and the effective response force is primarily a measure of concentration. Thus, the Department's performance objectives have been developed in the same manner to provide a better understanding of the link between its actual performance and the established performance objectives. Consequently, the Department's performance objectives are each written at the current baseline performance as well as benchmark performance. Again, the Department's response plan does not differentiate between service zones with regard to population density classifications. Therefore, the Department's performance objectives were developed to provide equal protection to all areas of the jurisdiction.

Fire performance objectives

For fire suppression incidents in the City of Rockford, all response time specifications shall be met at the 90th percentile, all critical tasks defined in Section Two of the Standards of Cover shall be completed, and:

Baseline

- For low risk fires (non-structure), one pumping apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping apparatus capacity, and the capability of incident mitigation.

Benchmark

- For low risk fires (non-structure), one pumping apparatus shall arrive on scene within six minutes of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping apparatus capacity, and the capability of incident mitigation.

* * * * * * *

Baseline

- For medium risk fires (non-hazmat, large/semi truck), one pumping apparatus and one aerial apparatus shall be dispatched. The first pumping apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity; and/or the second apparatus shall complete the effective response force within twelve minutes and twenty-four seconds of the initial dispatch capable of incident mitigation.

Benchmark

- For medium risk fires (non-hazmat, large/semi truck), one pumping apparatus and one aerial apparatus shall be dispatched. The first pumping apparatus shall arrive on scene within six minutes of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity; and/or the second apparatus shall complete the effective response force within ten minutes of the initial dispatch capable of incident mitigation.

* * * * * * *

Baseline

- For medium risk fires (one and two-family residential structures), three pumping apparatus, two aerial apparatus, two district chiefs, and one ambulance shall be dispatched. The first pumping apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, the capability of initiating command, rescue and fire suppression efforts, establishing “two in - two out”; and/or the remaining effective response force shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For medium risk fires (one and two-family residential structures), three pumping apparatus, two aerial apparatus, two district chiefs, and one ambulance shall be dispatched. The first pumping apparatus shall arrive on scene within six minutes of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, the capability of initiating command, rescue and fire suppression efforts, establishing "two in - two out"; and/or the remaining effective response force shall arrive on scene within ten minutes of the initial dispatch capable of completing the remaining defined critical tasks.

*** * * * * * ***

Baseline

- For high risk fires (commercial and industrial structures), three pumping apparatus, two aerial apparatus, two district chiefs, and one ambulance shall be dispatched. The first pumping apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, the capability of initiating command, rescue and fire suppression efforts, establishing "two in - two out"; and/or the remaining effective response force shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For high risk fires (commercial and industrial structures), three pumping apparatus, two aerial apparatus, two district chiefs, and one ambulance shall be dispatched. The first pumping apparatus shall arrive on scene within six minutes of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, the capability of initiating command, rescue and fire suppression efforts, establishing "two in - two out"; and/or the remaining effective response force shall arrive on scene within ten minutes of the initial dispatch capable of completing the remaining defined critical tasks.

*** * * * * * ***

Baseline

- For special risk fires (highrises and hospitals), four pumping, two aerial apparatus, two district chiefs, and one ambulance shall be dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch with four personnel, a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, the capability of establishing command and initiating the Department's highrise procedure; and/or the remaining effective response force shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For special risk fires (highrises and hospitals), four pumping, two aerial apparatus, two district chiefs, and one ambulance shall be dispatched. The first apparatus shall arrive on scene within six minutes of the initial dispatch with four personnel, a minimum of 500

gallons of water, a 1000 gpm or greater pumping capacity, the capability of establishing command and initiating the Department's highrise procedure; and/or the remaining effective response force shall arrive on scene within ten minutes of the initial dispatch capable of completing the remaining defined critical tasks.

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EMS performance objectives

For EMS incidents in the City of Rockford, all response time specifications shall be met at the 90th percentile, all critical tasks defined in Section Two of the Standards of Cover shall be completed, and:

Baseline

- For low risk EMS incidents (general medical calls), one fire apparatus staffed with four personnel (minimum of one paramedic and three EMT-Basics) and one ambulance (minimum of one paramedic and one EMT-Basic) are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch capable of initiating advanced life support treatment; and the second apparatus shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

Benchmark

- For low risk EMS incidents (general medical calls), one fire apparatus staffed with four personnel (minimum of one paramedic and three EMT-Basics) and one ambulance (minimum of one paramedic and one EMT-Basic) are dispatched. The first apparatus shall arrive on scene within six minutes of the initial dispatch capable of initiating advanced life support treatment; and the second apparatus shall arrive on scene within ten minutes of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

*** * * * * * ***

Baseline

- For medium risk EMS incidents (motor vehicle accident with injuries or a motor vehicle versus pedestrian), one pumping apparatus with a minimum of 500 gallons of water and a 1000 gpm or greater pumping capacity staffed with four personnel (minimum of one paramedic and three EMT-Basics); and one ambulance (minimum of one paramedic and one EMT-Basic) are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds of the initial dispatch capable of initiating advanced life support treatment, establishing triage, determining the need for additional units; and the second apparatus shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

Benchmark

- For medium risk EMS incidents (motor vehicle accident with injuries or a motor vehicle versus pedestrian), one pumping apparatus with a minimum of 500 gallons of water and a 1000 gpm or greater pumping capacity staffed with four personnel (minimum of one paramedic and three EMT-Basics); and one ambulance (minimum of one paramedic and

one EMT-Basic) are dispatched. The first apparatus shall arrive on scene within six minutes of the initial dispatch capable of initiating advanced life support treatment, establishing triage, determining the need for additional units; and the second apparatus shall arrive on scene within ten minutes of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For high risk EMS incidents (incident requiring extrication), one pumping apparatus with a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity and foam capability, staffed with four personnel (minimum of one paramedic and three EMT-Basics); one ambulance (minimum of one paramedic and one EMT-Basic); one heavy rescue apparatus (minimum of one paramedic and three EMT-Basics); and one district chief are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds capable of initiating incident command and advanced life support treatment, establishing triage, determining the need for additional units; and the remaining apparatus shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch to complete the effective response force of eleven personnel with the capability of completing the remaining defined critical tasks.

Benchmark

- For high risk EMS incidents (incident requiring extrication), one pumping apparatus with a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity and foam capability, staffed with four personnel (minimum of one paramedic and three EMT-Basics); one ambulance (minimum of one paramedic and one EMT-Basic); one heavy rescue apparatus (minimum of one paramedic and three EMT-Basics); and one district chief are dispatched. The first apparatus shall arrive on scene within six minutes capable of initiating incident command and advanced life support treatment, establishing triage, determining the need for additional units; and the remaining apparatus shall arrive on scene within ten minutes of the initial dispatch to complete the effective response force of eleven personnel with the capability of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For special risk EMS incidents (school bus accidents), one pumping apparatus with a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, staffed with four personnel (minimum of one paramedic and three EMT-Basics); one ambulance (minimum of one paramedic and one EMT-Basic); and one district chief are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds capable of initiating advanced life support treatment, establishing triage, determining the need for additional units; and the remaining apparatus shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

Benchmark

- For special risk EMS incidents (school bus accidents), one pumping apparatus with a minimum of 500 gallons of water, a 1000 gpm or greater pumping capacity, staffed with four personnel (minimum of one paramedic and three EMT-Basics); one ambulance (minimum of one paramedic and one EMT-Basic); and one district chief are dispatched. The first apparatus shall arrive on scene within six minutes capable of initiating advanced life support treatment, establishing triage, determining the need for additional units; and the remaining apparatus shall arrive on scene within ten minutes of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For special risk EMS incidents (shootings, etc.), one fire apparatus staffed with four personnel (minimum of one paramedic and three EMT-Basics); one ambulance (minimum of one paramedic and one EMT-Basic); and one district chief are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds capable of initiating advanced life support treatment, establishing triage, determining the need for additional units; and the remaining apparatus shall arrive on scene within twelve minutes and twenty-four seconds of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

Benchmark

- For special risk EMS incidents (shootings, etc.), one fire apparatus staffed with four personnel (minimum of one paramedic and three EMT-Basics); one ambulance (minimum of one paramedic and one EMT-Basic); and one district chief are dispatched. The first apparatus shall arrive on scene within six minutes capable of initiating advanced life support treatment, establishing triage, determining the need for additional units; and the remaining apparatus shall arrive on scene within ten minutes of the initial dispatch to complete the effective response force of six personnel with the capability of completing the remaining defined critical tasks.

* * * * * * *

Specialty services performance objectives

For specialty incidents in the City of Rockford, all response time specifications shall be met at the 90th percentile, all critical tasks defined in Section Two of the Standards of Cover shall be completed, and:

Baseline/Benchmark

- For incidents involving extrication, see high risk EMS performance objective listed above.

* * * * * * *

Baseline

- For water rescue incidents involving lakes, one pumping apparatus, one aerial apparatus, one boat, one district chief, one ambulance, the dive apparatus, and on-duty divers are dispatched. The first apparatus shall arrive on scene within nine minutes of the initial

dispatch able to begin assembling witnesses to identify victim's last known location, initiating command and rescue efforts; and the remaining effective response force shall arrive on scene within seventeen minutes of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For water rescue incidents involving lakes, one pumping apparatus, one aerial apparatus, one boat, one district chief, one ambulance, the dive apparatus, and on-duty divers are dispatched. The first apparatus shall arrive on scene within six minutes of the initial dispatch able to begin assembling witnesses to identify victim's last known location, initiating command and rescue efforts; and the remaining effective response force shall arrive on scene within fifteen minutes of the initial dispatch capable of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For water rescue incidents involving rivers, two pumping apparatus, two aerial apparatus, two district chiefs, one boat, one ambulance, the dive apparatus, and on-duty divers are dispatched. The first apparatus shall arrive on scene within six minutes of the initial dispatch able to begin assembling witnesses to identify victim's last known location, initiating command and rescue efforts; and the remaining effective response force shall arrive on scene within twenty-two minutes of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For water rescue incidents involving rivers, two pumping apparatus, two aerial apparatus, two district chiefs, one boat, one ambulance, the dive apparatus, and on-duty divers are dispatched. The first apparatus shall arrive on scene within six minutes of the initial dispatch able to begin assembling witnesses to identify victim's last known location, initiating command and rescue efforts; and the remaining effective response force shall arrive on scene within twenty minutes of the initial dispatch capable of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For technical rescue incidents, one pumping apparatus, one aerial apparatus, two district chiefs, one ambulance, the hazardous materials apparatus, and the technical rescue apparatus are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds capable of initiating command, identifying hazards, performing risk assessment; and the remaining effective response force shall arrive on scene within fifteen minutes of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For technical rescue incidents, one pumping apparatus, one aerial apparatus, two district chiefs, one ambulance, the hazardous materials apparatus, and the technical rescue apparatus are dispatched. The first apparatus shall arrive on scene within six minutes capable of initiating command, identifying hazards, performing risk assessment; and the

remaining effective response force shall arrive on scene within fifteen minutes of the initial dispatch capable of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For ARFF incidents involving Alert 2, two ARFF apparatus, one pumping apparatus, one aerial apparatus (Quint 7, when available), one district chief, and one ambulance are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds capable of initiating command and awaiting further instructions from the control tower; and the remaining effective response force shall arrive on scene within ten minutes of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For ARFF incidents involving Alert 2, two ARFF apparatus, one pumping apparatus, one aerial apparatus (Quint 7, when available), one district chief, and one ambulance are dispatched. The first apparatus shall arrive on scene within six minutes capable of initiating command and awaiting further instructions from the control tower; and the remaining effective response force shall arrive on scene within ten minutes of the initial dispatch capable of completing the remaining defined critical tasks.

* * * * * * *

Baseline/Benchmark

- For ARFF incidents involving Alert 3, two ARFF apparatus, three pumping apparatus, three aerial apparatus (including Quint 7, when available), two district chiefs, and one ambulance are dispatched. The first ARFF apparatus shall arrive on scene within three minutes to satisfy 14CFR Part 139: *Certification of Airports*, the first non-ARFF apparatus shall arrive on scene within six minutes capable of initiating command, determining the need for additional units; and the remaining effective response force shall arrive on scene within twelve minutes of the initial dispatch capable of completing the remaining defined critical tasks.

* * * * * * *

Baseline

- For hazardous materials incidents, two pumping apparatus, two aerial apparatus, two district chiefs, one ambulance, and the hazmat trailer (including Quint 5) are dispatched. The first apparatus shall arrive on scene within seven minutes and twelve seconds capable of initiating command, identifying hazards, performing risk assessment; and the remaining effective response force shall arrive on scene within sixteen minutes of the initial dispatch capable of completing the remaining defined critical tasks.

Benchmark

- For hazardous materials incidents, two pumping apparatus, two aerial apparatus, two district chiefs, one ambulance, and the hazmat trailer (including Quint 5) are dispatched. The first apparatus shall arrive on scene within six minutes capable of initiating command, identifying hazards, performing risk assessment; and the remaining effective response force shall arrive on scene within fifteen minutes of the initial dispatch capable of completing the remaining defined critical tasks.

* * * * * * *

Summary

The Department has designed performance objectives that support its mission statement, industry standards and applicable legislation. Each performance objective contains response time benchmarks for the initial arriving apparatus and an effective response force, adequate resources to mitigate each incident, and the expected percentile measurement. With specific objectives the Department is able to quantify performance, develop methods to identify and improve performance weaknesses, and satisfy community expectations as expressed by the Citizen's Advisory Group.

Section Five: Compliance Methodology

As previously discussed in Sections One and Two, the Department provides both fire and emergency medical service to the community along with several specialty services to include extrication, hazardous materials response, airport rescue and firefighting, technical rescue, and water rescue. The levels of service for each of the areas have also been clearly defined. As the number and types of incidents expand, the Department will continue to review and develop new performance objectives and measures as needed.

Levels of risk have been clearly defined and corresponding risk categories assigned for the different levels of service provided. The Department uses an extensive risk matrix, which considers occupancy risk and density, fire density, and response times, to evaluate and categorize occupancy risks throughout the jurisdiction.

Additionally, the Department has developed response catchment areas for first and full compliment response. All of these factors combined have provided a comprehensive and substantive approach to performance measurement and evaluation. As illustrated below, the Department will use the CFAI/CPSE model for compliance methodology as the avenue to provide continuous evaluation of the services.

Review Performance Measures

As indicated in Section Three, performance has been measured for fire, EMS and specialty services. The Department compared actual (baseline) response time performance to CFAI/CPSE credible timeframes as well as benchmarks for response times as established by NFPA 1710. Performance measures will continue to be reviewed and developed on an annual basis, or as dictated by need, in an effort to comply with industry standards.

Evaluate Performance

As recommended by CFAI, the Department used distribution, concentration and reliability to comprehensively evaluate its response times over a three year period. Jurisdictional, still territory, first arriving apparatus, and effective response force arrival were all included as part of the evaluation. The Department will continue to monitor performance at these various levels and incident types.

Develop Compliance Strategies

As discussed in Section Three, the Department's analysis revealed both strengths and weaknesses. As a result the Department has developed an action plan to more accurately assess its performance. Although data collection was permissible, much of it had to be done "by hand" to ensure accuracy. The Department now has a much better understanding of what information is necessary, and how to retrieve that information in a more efficient manner.

The Department has recognized weaknesses in its data collection in the following areas: incident type identification, access to response time information, and effective response force documentation. Certain issues with incident type identification have already been addressed, and additional training is currently being developed for implementation in 2010. The documentation shall include the importance of accurate data, the various components of NFPA 1710, and the value these elements have on assessing Department performance.

The Department is also developing a method for front line personnel to retrieve data from its SharePoint website. Upon completion personnel shall be able to view the following real-time data: number of incidents by date range, apparatus, and incident type; response times to include initial and effective response force; and unit hour utilization. As the Department identifies more information deemed valuable to personnel, additional data will be made accessible through the SharePoint website.

Currently, the Department is able to project the reallocation and/or addition of resources through spatial modeling in order to explore different solutions for identified distribution and concentration issues. Catchment area and redundancy maps, based on travel time and distance calculations afforded by GIS software, can be compared in an effort to develop possible solutions for recognized weaknesses. The Department will continue to use this method as additional and/or different distribution and concentration issues occur.

Communicate Expectations to Organization

The Department has prepared a transparent document which will communicate expectations to the organization, political leaders, and the community. Considerable emphasis has been placed on the accreditation process and clearly relaying information in an understandable manner.

Weaknesses referenced above and appropriate resolutions will be communicated to personnel through Department-wide training. Mechanisms for feedback from Department personnel including response alterations, goal establishment, and open communication opportunities exist within the current organizational structure. The SharePoint website provides an avenue for disseminating information to front-line personnel.

Consequences for noncompliance will be communicated to the organization through the same training programs discussed for the development of compliance strategies. Significant effects include, but are not limited to, delivery of service to the community, failure to meet accreditation parameters, and inability to meet community expectations.

Validate Compliance

As mentioned above, verification tools have been identified to evaluate compliance for the jurisdiction, still territories, service zones, first arriving apparatus, and effective response force arrival for all types of incidents. Analysis will be conducted on a monthly, quarterly, and annual basis.

Make Adjustments and Repeat Process

The Department will consider unit hour utilization and performance gap measurement in conjunction with unit availability as appropriate trigger mechanisms, along with plotting noncompliant incidents on a map and service zone analysis to determine the need for adjustments in service delivery.

Unit Hour Utilization

It is important to explain the unit hour utilization (UHU) concept and how it is calculated. The UHU is calculated by using a constant for the amount of time committed to an incident multiplied by the number of incidents to which an apparatus responds, and then divided by the hours of operations for that apparatus.

$$\frac{(\text{\# of incidents}) * (\text{time committed per incident})}{\text{Hours of operation}}$$

As recommend by CFAI/CPSE, the constant used to calculate the UHU for fire apparatus is one half hour. The Department has determined an alternate constant to calculate the UHU for ambulances. The Illinois Department of Public Health (IDPH) requires that a run report be

completed and left with the receiving hospital before the ambulance can return to available status.[3] Consequently, the time committed by an ambulance to an incident includes the completion of associated documentation. Thus the Department has determined fifty minutes per incident to be a reasonable constant for calculating an ambulance's UHU.

In addition to calculating the UHU, the Department has adapted the CFAI/CPSE Fire Station Activities matrix[4] to examine the daily workload for each apparatus. The time committed to incidents and the time dedicated to incident-related activities for fire apparatus include the one half hour constant for each incident with an additional fifteen minutes allotted for documentation and equipment restocking. Because documentation and equipment restocking are already accounted for in the ambulances' time committed to incidents, there is no additional time allotted for incident-related activities for the each of the five ambulances.

It is important to note that the only designated out of service time for fire apparatus is the incident commitment time, and the only designated out of service time for ambulances is the incident commitment plus the time to complete mandatory documentation. The remaining activities and hours depicted in the Fire Station Activities matrix for both fire apparatus and ambulances are not out of service activities – personnel complete these activities while still in service and ready to respond to calls. The time dedicated to station activities totaled fourteen hours, consisting of three hours of required training (Office of the State Fire Marshal), two hours for maintenance and station duties, two hours for meals, one hour for physical fitness, and six hours for sleep. The Department based these time allotments on the CFAI/CPSE recommendations.

The UHU/Fire Station Activity Matrix table will be made available on the Department's SharePoint website so personnel may view the information in real time. The user will be able to view the UHU based on the previous year's worth of data at any given time. In addition to providing a feedback mechanism for front line personnel, the UHU/Fire Station Activity Matrix table quantifies the daily and yearly workload of each apparatus, and gives some insight into how front line performance effects the organization.

The following table calculates the UHU for each fire apparatus and ambulance using the aforementioned formula, and depicts the daily fire station activities for each apparatus. The table is a sample using one calendar year's (2009) worth of data. It is important to clarify that the left side of the table calculates the UHU based on one year's worth of data, whereas the right side of the table calculates station activity based on one average day's worth of data.

[3] Illinois Compiled Statutes, Title 77: Public Health; Chapter I: Department of Public Health, Subchapter f: Emergency Services and Highway Safety, Part 515 Emergency Medical Services and Trauma Center Code, Section 515.350 Data Collection and Submission.
[4] Commission on Fire Accreditation International. *Standards of Cover*. 5th Ed. Pg. 99.

Unit Hour Utilization			Fire Station Activity Matrix				
Previous 12 months			Per each 24-hour Shift				
Apparatus	Incidents/Year	UHU	Incidents	# of Hours @ Incidents	# of Hours Incident-Related Activities	# of Hours - Station Activity	Dedicated Hours
Engine 1	3078	0.18	8	4	2	14	20
Ladder 1	1825	0.10	5	3	1	14	18
Engine 2	2968	0.17	8	4	2	14	20
Ladder 2	2474	0.14	7	3	2	14	19
Engine 3	1900	0.11	5	3	1	14	18
Engine 4	1750	0.10	5	2	1	14	18
Quint 5	2014	0.11	6	3	1	14	18
Engine 6	2070	0.12	6	3	1	14	18
Quint 7	1685	0.10	5	2	1	14	17
Engine 8	1753	0.10	5	2	1	14	18
Quint 9	2294	0.13	6	3	2	14	19
Engine 10	2328	0.13	6	3	2	14	19
Engine 11	2586	0.15	7	4	2	14	19
Charlie 12	3103	**0.29**	9	7	0	14	21
Charlie 16	3663	**0.35**	10	8	0	14	22
Charlie 27	4340	**0.41**	12	10	0	14	**24**
Charlie 28	3734	**0.35**	10	8	0	14	22
Charlie 29	4462	**0.42**	12	10	0	14	**24**

CFAI/CPSE regards a traditional fire station system as a static (fixed) deployment system, and considers the threshold point at which a unit is fully committed to be .25 to .30 UHU (4300 to 5200 incidents/year). [5] Again, the Department has differentiated between fire apparatus incident commitment time and ambulance incident commitment time. Therefore, a different threshold value of .36 to .41 UHU (3800 to 4380 incidents/year) is used to measure the point at which an ambulance is fully committed. The UHU is a theoretical measurement of a unit's workload and the percent availability, as explained in Section 3, is an actual measurement of a unit's capacity to respond to incidents. In theory the combination of these two measurements should total 100 percent. As previously mentioned the UHU quantifies a unit's workload, provides a method for validating output, and identifies the trigger mechanism for additional resources.

[5] Commission on Fire Accreditation International. *Standards of Cover*. 5th Ed. Pg. 96.

As a fire apparatus UHU exceeds .20 (3500 incidents/year), the time available for additional activities such as preplans, hose testing, hydrant testing, public service duties, additional training and professional development, etc. is proportionately decreased. Thus, the trigger mechanism for considering additional resources should be .20 UHU. Once a fire apparatus UHU exceeds the threshold value of .30 (5200 incidents/year), the time allotted for station activities (as noted in the Fire Station Activities Matrix) must be decreased. Thus, in order for a fire apparatus to respond to additional incidents beyond the threshold value, time must be diverted from essential activities.

Using the same formula for UHU with a different factor representing time committed, the Department calculated the threshold range for an ambulance to be .36 to .41 (3800 to 4380 incidents/year) and the trigger mechanism for an ambulance to be .31 UHU (3270 incidents/year). *See Appendix 5A: Ambulance UHU Calculation.*

Performance Gap Measurement

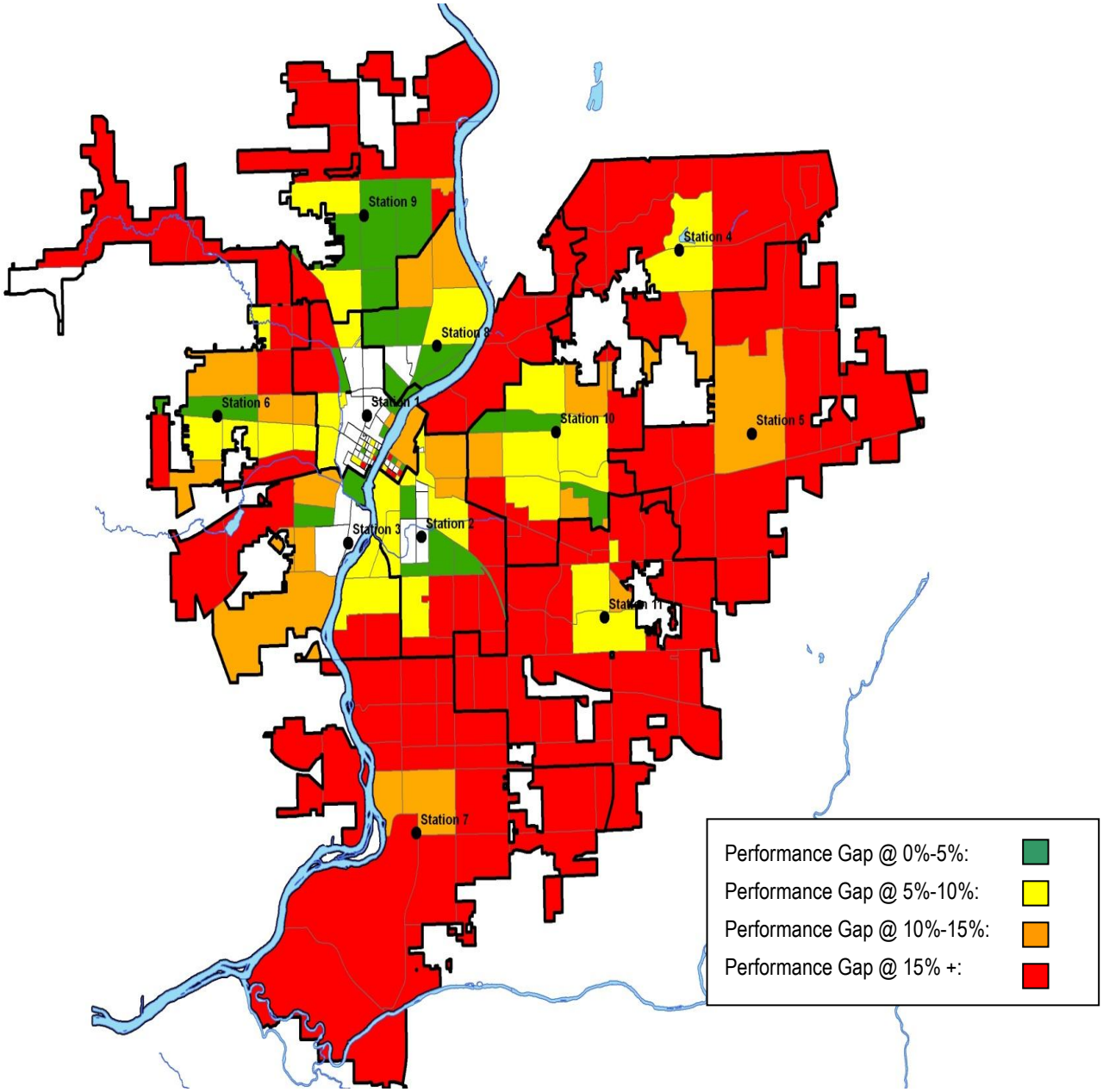
The Department calculated the performance gap by station still territory for first arrival for all incidents regarding the benchmark performance and credible timeframe performance for the three year period in the study. The performance gap is the measured difference between the ***actual*** performance and the ***intended*** (90th percentile) performance. The following table shows the benchmark performance gap for each station still territory.

Benchmark (4:00 Travel Time) Performance Gap July 2006 - June 2009					
Still	**Total**	**Over 4:00**	**%**	**Performance Value**	**Gap**
Station 1	8,544	1,157	13.54%	86.46%	3.54%
Station 2	8,776	1,481	16.88%	83.12%	6.88%
Station 3	2,799	525	18.76%	81.24%	8.76%
Station 4	2,241	879	39.22%	60.78%	29.22%
Station 5	3,894	1,446	37.13%	62.87%	27.13%
Station 6	4,543	1,012	22.28%	77.72%	12.28%
Station 7	3,116	1,735	55.68%	44.32%	45.68%
Station 8	2,562	582	22.72%	77.28%	12.72%
Station 9	4,776	869	18.20%	81.80%	8.20%
Station 10	3,932	911	23.17%	76.83%	13.17%
Station 11	5,121	2,143	41.85%	58.15%	31.85%

Performance gap @ 0 - 5%: Green
Performance gap @ 5 – 10%: Yellow
Performance gap @ 10 – 15%: Orange
Performance gap @ 15% +: Red

In an effort to identify specific areas of concern within the still territories, the Department further analyzed the performance gap at the service zone level. The following map illustrates the benchmark performance gap for the individual service zones.

Benchmark Performance Gap By Service Zone
(4:00 Travel Time)



As indicated by the above map, the areas with the most redundancy of coverage (Stations 1, 2 and 3) are the only station still territories that do not show a benchmark performance gap. Because the Department's performance for travel time (fire – 5:05 and EMS – 5:16) is much closer to the CPSI/CFAI credible timeframe (5:12) than the benchmark performance time (4:00), it is expected that a service zone benchmark performance gap would exist in a majority of the service zones throughout the jurisdiction.

The following table shows the credible timeframe performance gap for each station still territory.

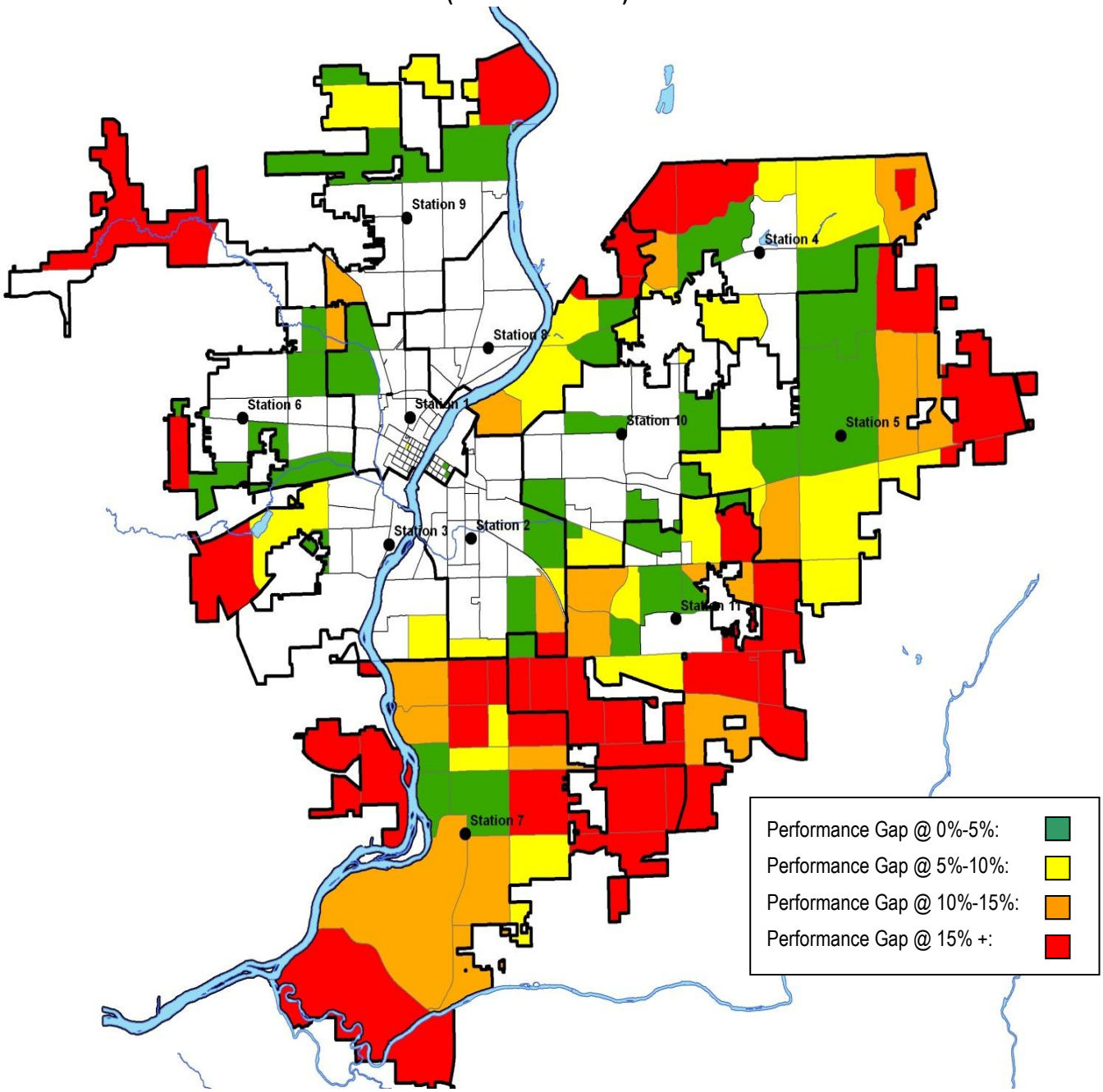
Credible Timeframe (5:12 Travel Time) Performance Gap
July 2006 - June 2009

Still	Total	Over 5:12	%	Performance Value	Gap
Station 1	8,544	374	4.38%	95.62%	-5.62%
Station 2	8,776	528	6.02%	93.98%	-3.98%
Station 3	2,799	194	6.93%	93.07%	-3.07%
Station 4	2,241	394	17.58%	82.42%	7.58%
Station 5	3,894	630	16.18%	83.82%	6.18%
Station 6	4,543	375	8.25%	91.75%	-1.75%
Station 7	3,116	709	22.75%	77.25%	12.75%
Station 8	2,562	248	9.68%	90.32%	-0.32%
Station 9	4,776	341	7.14%	92.86%	-2.86%
Station 10	3,932	291	7.40%	92.60%	-2.60%
Station 11	5,121	1,001	19.55%	80.45%	9.55%

Performance gap @ 0 - 5%: Green
Performance gap @ 5 – 10%: Yellow
Performance gap @ 10 – 15%: Orange
Performance gap @ 15% +: Red

Again, the Department further analyzed the credible timeframe performance gap at the service zone level. Several still territories show a negative performance gap, indicating that the performance value (actual performance) exceeds the 90th percentile standard.
The following map illustrates the credible timeframe performance gap for the individual service zones.

Performance Gap By Service Zone
(5:12 Travel Time)



Because the Department's percentile performance for travel time is closer to the CPSI/CFAI credible timeframe (5:12), it is expected that there would be much less of a performance gap at this measurement within the individual service zones throughout the jurisdiction. Consequently, the above map will be more valuable regarding the evaluation and recommendations for Section Six.

Based on the CPSE/CFAI format, the Department has designed a tiered decision matrix depicting the trigger, threshold and maximum capacity values for fire apparatus and ambulances including possible solutions.

Trigger Mechanism Decision Matrix	
Mechanism	**Possible Solutions**
Trigger: *Fire Apparatus –* • Incidents/year: 3500 – 4300 • UHU: .20 - .25 • Unit availability: 87% -90% • Performance Gap: 5% -10% *Ambulances –* • Incidents/year: 3260 - 3800 • UHU: .31-.36 • Unit Availability: 70% -80% • Performance Gap: 5% - 10%	• Begin evaluation of possible causes • Reassign apparatus responsibilities • Still territory adjustment
Threshold: *Fire Apparatus –* • Incidents/year: 4300 – 5200 • UHU: .25 - .30 • Unit availability: 84% - 87% • Performance Gap: 10% -15% *Ambulances –* • Incidents/year: 3800 - 4380 • UHU: .36 -.41 • Unit Availability: 65% - 70% • Performance Gap: 10% - 15%	• Apparatus redistribution • Station relocation • Still territory adjustment
Maximum Capacity: *Fire Apparatus –* • Incidents/year: >5200 • UHU: >.30 • Unit availability: 81% -84% • Performance Gap: >15% *Ambulances –* • Incidents/year: >4380 • UHU: >.41 • Unit Availability: <65% • Performance Gap: > 15%	• Add apparatus to existing stations • Add stations

Summary

The Department established a compliance methodology process to provide a continuous evaluation of service level objectives and performance measures, selecting a six-step compliance model to continuously evaluate performance in an effort to identify problems and seek solutions in its delivery of service to the community.

Documentation training for all personnel is currently being developed by the Department. This curriculum will include the importance of accurate coding and time-stamping, the value of accurate data, and additional data to be collected. The documentation training is scheduled for implementation this year.

In addition to calculating the UHU for fire apparatus, the Department customized the UHU for ambulances to account for mandated incident-related documentation. The Department has designed the UHU/Fire Station Activity Matrix table which will be made available to personnel through the Department's SharePoint website. This will provide an avenue to communicate individual apparatus performance for any twelve month period. Personnel will also have access to current time performance measures for different components of the overall response time.

The Department calculated performance gaps for each still territory and service zone to geographically identify system performance weaknesses. Percentage gaps were calculated by still territory for both the benchmark performance and the credible timeframe performance. The performance gap for each service zone within the jurisdiction was also calculated for both the benchmark performance and credible timeframe performance, and projected onto a City-wide map to assist in identifying specific areas of concern.

Trigger mechanisms, threshold and maximum capacity values were established and placed – along with incident frequency, UHU, apparatus availability, and performance gaps - into a tiered matrix assigning possible solutions for each. The purpose of the *Trigger Mechanism Decision Matrix* is to allow the Department to identify areas of performance weakness in a comprehensive manner. The tiered approach provides a gradual process in developing solutions for recognized weaknesses prior to resource exhaustion and decline in delivery of service.

Accumulated data and analysis of overall performance will allow the Department to complete a comprehensive evaluation of service delivery to the community, and prepare recommendations for improvement.

Section Six: Overall Evaluation

Introduction

Historically, it has been the Rockford Fire Department's mission to be proactive in its approach to public safety. The Department has completed a comprehensive review and evaluation of the community, levels of service, Department capabilities, and citizen expectations. Throughout the process, the Department has identified many areas in which the current service meets or exceeds performance measures, as well as several opportunities for improvement. The extensive risk assessment and reliability study confirmed recognized weaknesses and revealed additional areas for improvement. The study also provided the Department with positive reinforcement regarding its current delivery of service to the community.

Evaluation of Current Services

Strengths

The Department has adapted a transportation study program to meet local needs by developing service zones. Each still territory is divided into the geographically smaller service zones. This allows the Department to analyze service areas in a much more focused manner. Risk and performance can then be evaluated on a still territory basis as well as by individual service zones, in an effort to more accurately pinpoint areas where service delivery may be improved.

The Department has developed a risk matrix and comprehensive risk scoring system which incorporates occupancy risk, occupancy density, fire density, and response time. These tools are then used to assist in building the Department's response plan, and planning for resource allocation.

Due to location and geography, the Department has assimilated to its surroundings by offering a variety of services to the community; to include fire suppression, EMS advanced life support for first response and transport, and specialties in the following areas: water rescue, airport rescue, hazardous materials, technical rescue, and extrication. It is especially important that the Department offers such a variety of services, due to its geographical isolation from other communities that posses such capabilities.

All types of emergency incidents have been critically tasked and built into the response plan to provide adequate resources for such incidents.

The Department has attempted to provide equal protection through its distribution of resources.As the jurisdiction has expanded eastward, the Department has responded by reallocating resources into newly annexed areas. Specialty apparatus and teams have been positioned throughout the City to best utilize their capabilities.

In an effort to provide redundancy of coverage, additional resources have been concentrated in the areas of highest incident density. The Department has also designed smaller still territories to provide the greatest amount of coverage in areas with the greatest amount of need.

The Department meets the CPSE/CFAI metropolitan/urban population density credible timeframe for fire response regarding first arrival and effective response force (ERF), and for EMS regarding an ERF. Although first arrival for EMS does not meet the credible timeframe for the three year period covered in the reliability study, the two most recent years' data do meet the first arrival credible timeframe. It is important to note that the staffing of fire apparatus has a direct impact on the Department's ability to meet the credible timeframe for an ERF. Currently, the Department staffs its fire apparatus at four personnel, thus lowering the amount of time and the number of apparatus necessary to assemble an ERF on scene. The table below illustrates how the Department's travel time baseline performance compares to both the credible timeframe and the benchmark.

Travel Time Performance Comparison
July 2006 - June 2009

	Fire		EMS	
	First Arrival	ERF	First Arrival	ERF
Baseline	5:05	9:25	5:16	8:09
Credible Timeframe (CPSE/CFAI)	5:12	10:24	5:12	10:24
Benchmark (NFPA 1710)	4:00	8:00	4:00	8:00

As a result of the accreditation process, the Department has already made improvements in the areas of data collection, documentation and personnel access to relevant data. The Department has begun to train the appropriate personnel in using the NFPA 1710 form for fire incidents included in the reporting software, and is preparing to train the remainder of the Department in the use of the same form for EMS. Improvements to documentation are being addressed in a training program planned for delivery this year. The Department's SharePoint site provides access to incident frequency data by apparatus for any time period. Additionally, the *Unit Hour Utilization/Fire Station Activity Matrix* will be made available to personnel on the SharePoint site.

Weaknesses

Although the Department has attempted to provide equal distribution to all areas of the jurisdiction, several pockets of noncompliance have been identified. As explained in Section Three, and illustrated on the *EMS Incidents Outside Four-Minute (Travel Time) Catchment Areas Map* (page 48) and the *Performance Gap By Service Zone (5:12 Travel Time)* map (page 80), five different areas demonstrate a weakness in distribution.

The area of immediate concern lies at the confluence of Stations 2, 7, and 11's still territories. Historically, this area has had extended travel times combined with a relatively high incident frequency resulting in medium to high range total risk scores for the service zones in this area as indicated in Section Two.

The City's geographical growth, primarily to the north and east, has proved to be problematic in terms of distance and lack of distribution. The jurisdiction has increased in geography by 45% since the Department last constructed a new fire station (not additional) in 1989. As a result, both Station 4 and 5's still territories have increased in size. Catchment and performance gap maps both align to illustrate this area of noncompliance.

The Department's reliability study also showed that the eastward growth has affected the area between Station 5 and 11's still territories. A combination of incident frequency and the location of Station 5 contribute to this swath of noncompliance between the two still territories. Again, catchment and performance gap maps both align, illustrating this area of extended response times.

Station 4's still territory showed areas of noncompliance along the northwestern area, which is primarily due to poor infrastructure. This particular area of Station 4's still territory is mostly residential with very few main thoroughfares. Additionally, most of the roads in this area are neither directionally parallel nor perpendicular and contain an enormous amount of curves and bends, thus posing access issues for Engine 4.

A review of individual still territory maps (Appendix 3A – *Station Still Territory Maps: EMS Incidents > 4 Minutes*) shows a large cluster of incidents present along the eastern edge of Station 6's still territory. It is believed that this is primarily caused by training. Station 6 houses both the Recruit Training Academy and serves as the Department's training facility. As a result Engine 6 is out of service and unavailable a disproportionate amount of time, particularly during the peak incident time period.

As explained in Section 3, the Department attempts to equally distribute ambulance coverage throughout the jurisdiction, and examined ambulance response as a single component of an effective response force (ERF). Incident frequency and the current number of ambulances prohibit an ambulance from remaining in its respective still territory for any extended period of time, particularly during peak incident hours. Thus, the ambulances have a low rate of availability and high unit hour utilization (UHU). Based on *Unit Hour Utilization/Fire Station Activity Matrix* (page 76), three ambulances exceed the maximum capacity and the remaining two fall within the threshold range.

The current financial situation, both nationally and locally, has had a dramatically limiting effect on the ability of the Department to maintain or improve future service levels, as well as prepare for future capital programs. At this time, long-range financial plans addressed in the capital improvement plan have not been allocated unless grants, subsidies, and projected revenue are secured.

Recommendations

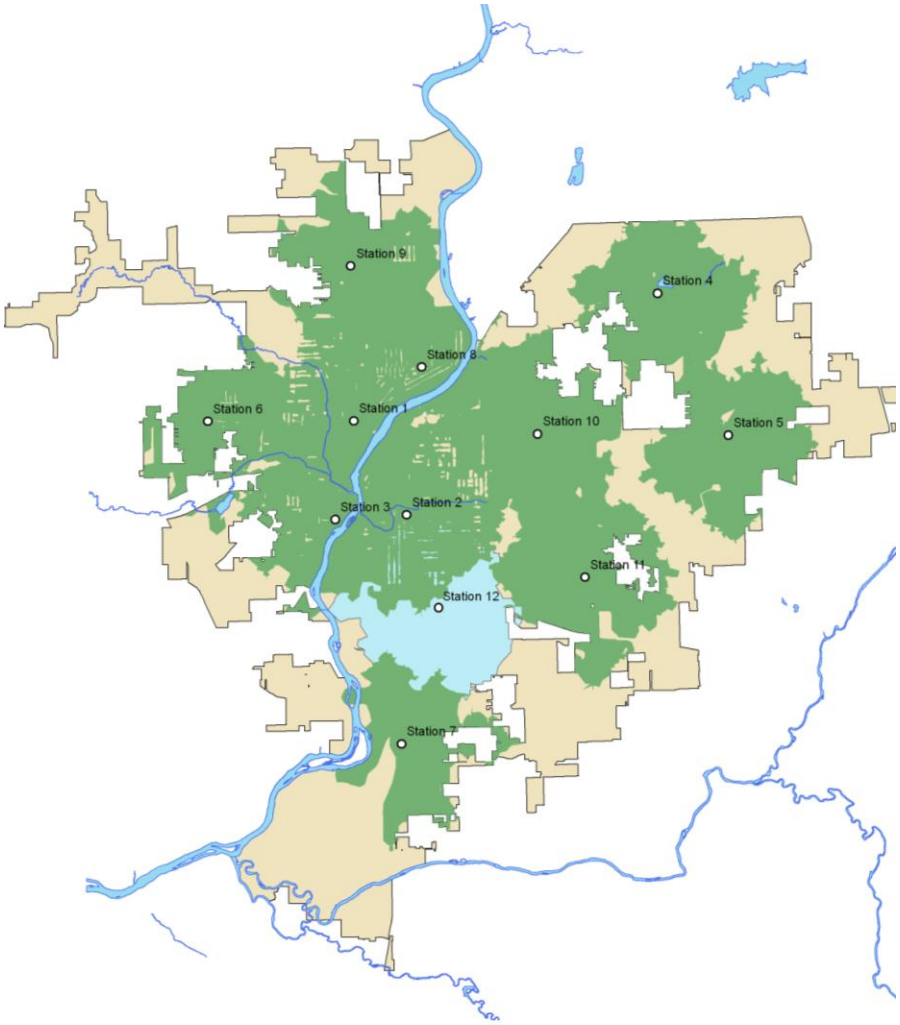
The Department has developed and evaluated various scenarios in an effort to address recognized weaknesses and to capitalize on organizational strengths. Each proposal has been based on the three-year reliability study, and reviewed for its technical merit and operational feasibility. Catchment mapping and performance gap analysis has been included in the preparation of these recommendations. The scenarios have been selected and prioritized based

on recognized needs and financial practicality. All scenarios considered, but not used as a part of the recommendations have been provided in Appendix 6A.

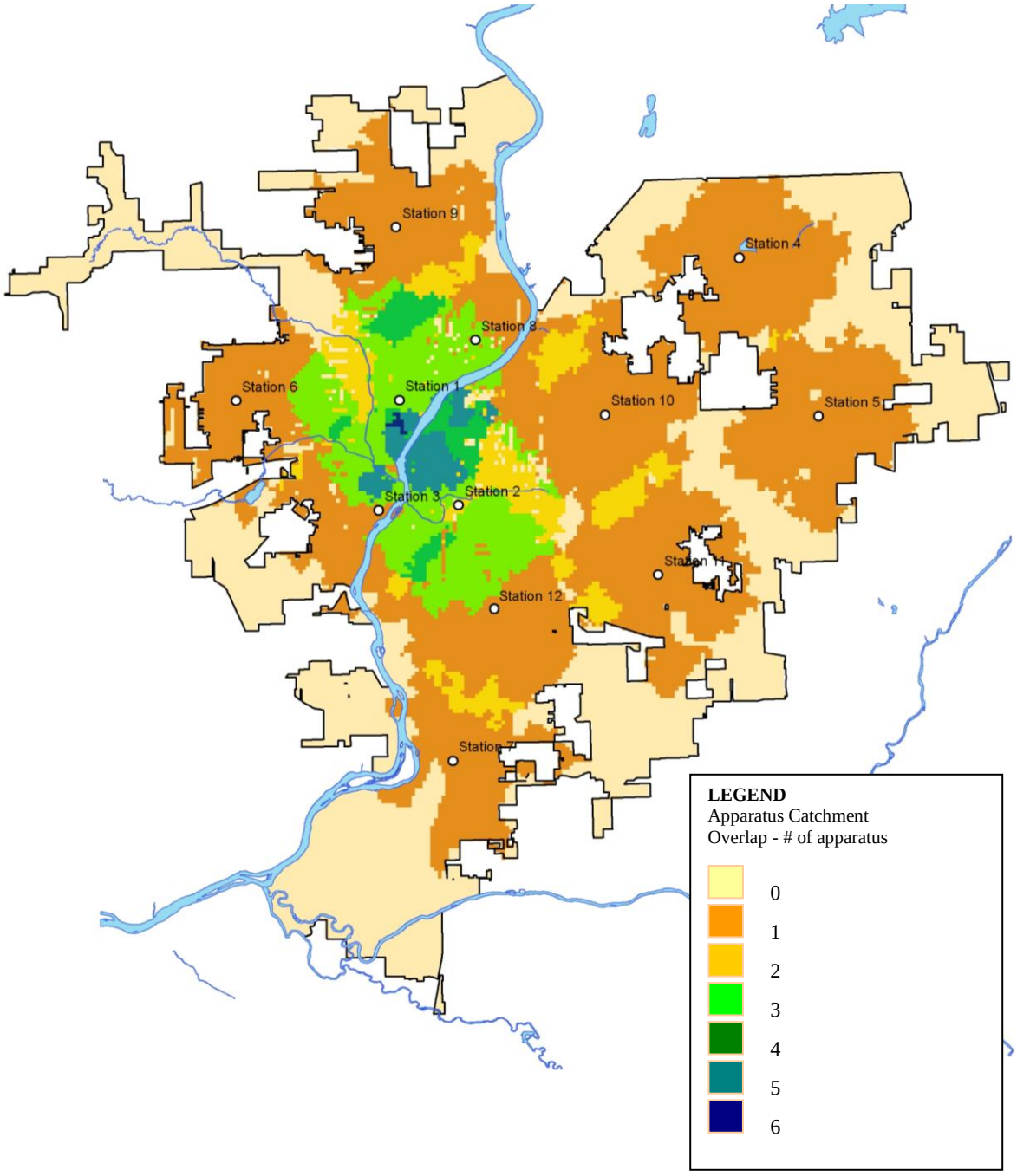
Stations 2, 7 and 11/Confluence Area

As stated earlier in this section, the confluence area between Stations 2, 7, and 11 is the area of greatest concern and in need of the most immediate attention. Several different potential solutions involving several different station locations were reviewed. The most effective resolution would be to place an additional apparatus in a new station located at Harrison Avenue and 11th Street. This would address the noncompliance identified on both the *Performance Gap By Service Zone (5:12 Travel Time)* map (page 80) and the catchment maps in Section 3 (pages 40 & 48) without any negative impact to other areas of the City. The maps below show the improved distribution coverage and overlap in the confluence area that should be realized with this additional station.

Station 12 Addition at Harrison Avenue and 11th Street
Four Minute (Travel Time) Catchment Map



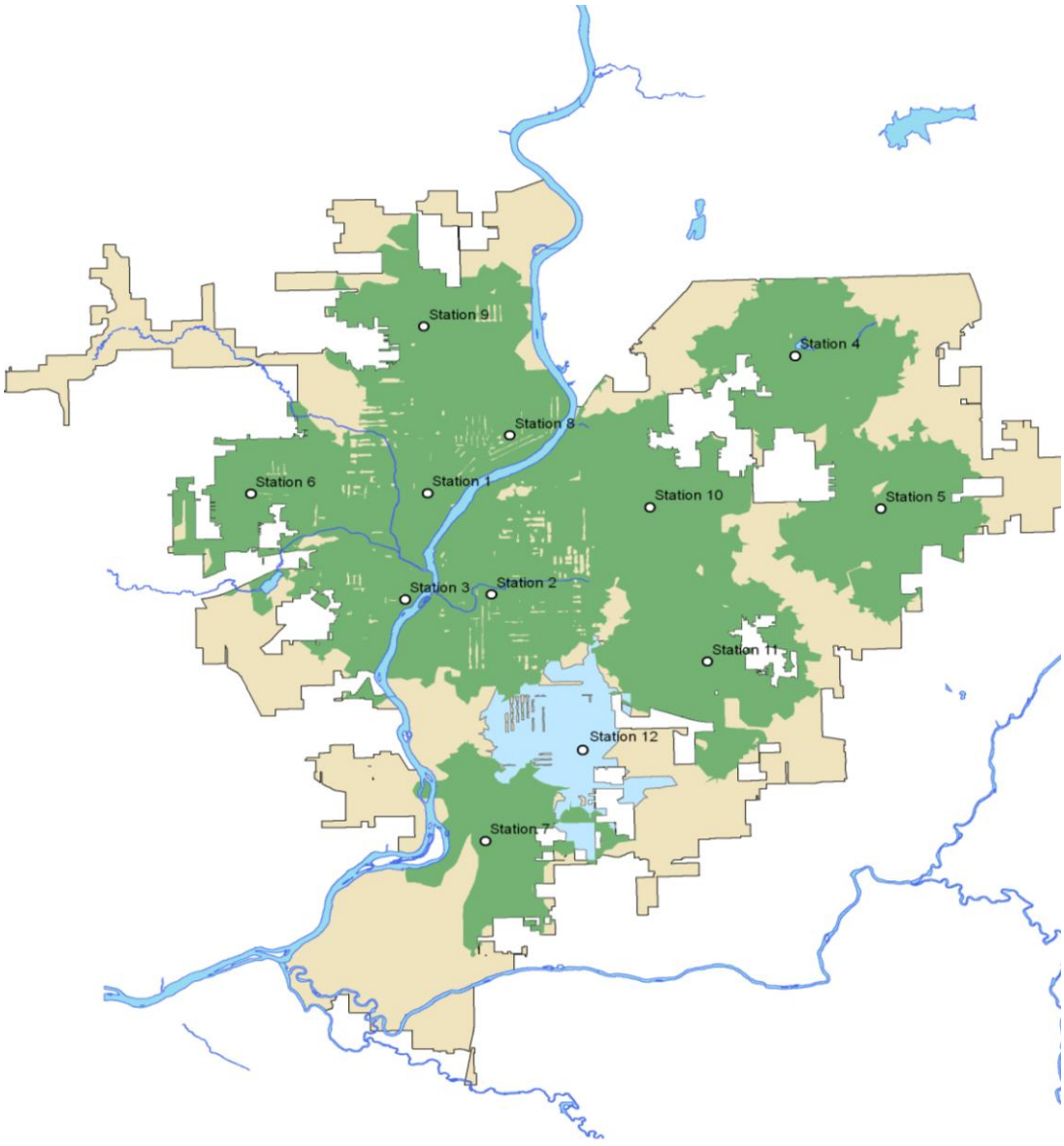
Station 12 Addition at Harrison Avenue and 11th Street
Apparatus Four-Minute (Travel Time) Catchment Overlap



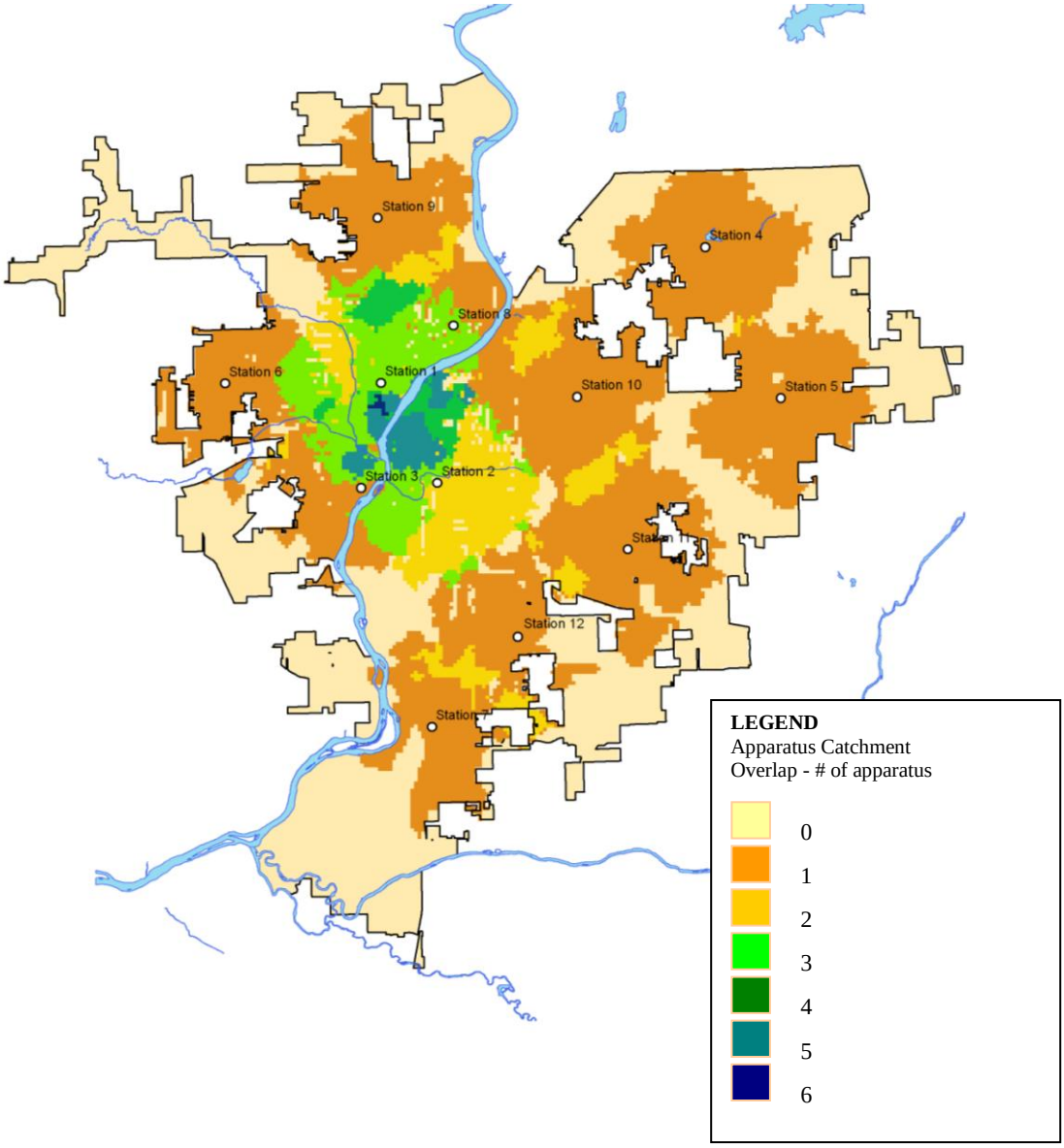
The Department also reviewed a more economical yet less effective solution to addressing noncompliance in the confluence area. A facility is currently available to the Department through a formerly occupied station located at Sawyer Road and 19th St. This location would provide limited coverage to the confluence area and would be less effective in both

distribution and redundancy of coverage. The only advantage of this solution over the Harrison Avenue and 11th Street location is that the facility already exists and the plan could be quickly implemented. However, catchment maps indicate that the Department would still need to develop a more comprehensive solution to address the entire confluence area.

Station 12 at Sawyer Road and 19th Street
Four Minute (Travel Time) Catchment Map



Station 12 at Sawyer Road and 19th Street
Apparatus Four-Minute (Travel Time) Catchment Overlap

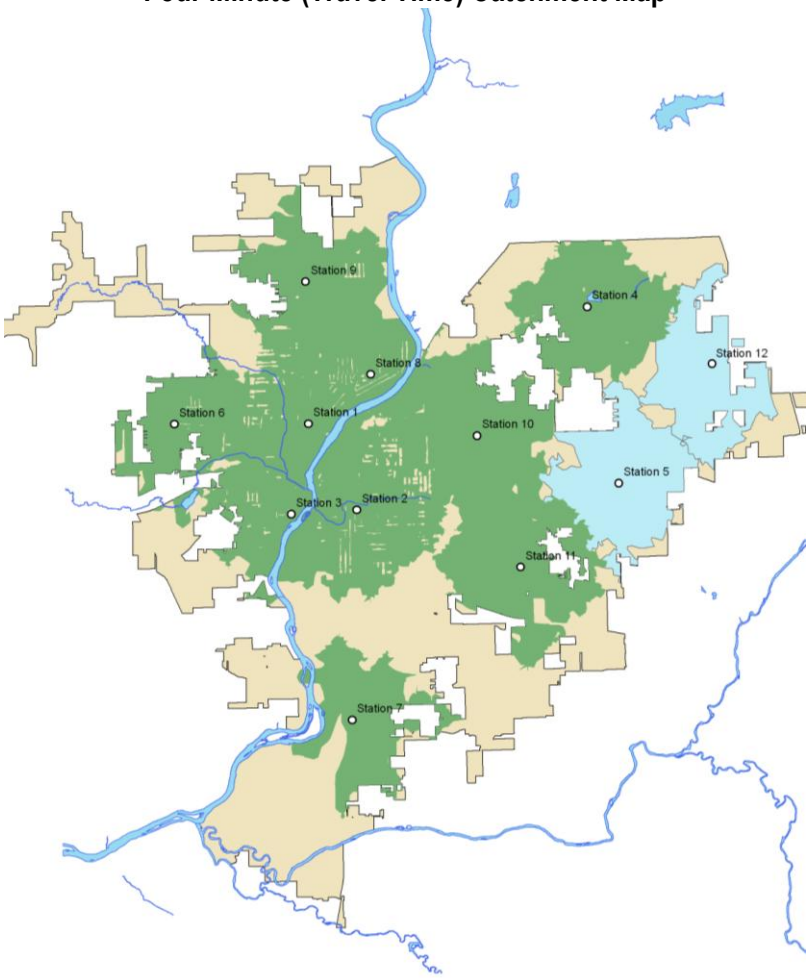


While placement of an additional apparatus at the existing facility would be more economical and could be immediately implemented, the catchment and overlap maps indicate that coverage to the confluence area would be much more limited. Specifically, portions of the mid to high incident density (see *Incident Density by Census Tract: July 2006 – June 2009 map*, page 12*)* West State Street/Kishwaukee Street corridor would be left unprotected. Placement of an additional station at Harrison Avenue and 11th Street would provide protection for a majority of the confluence area, and provide a greater redundancy in coverage for adjacent still territories because of better access to arterial roadways.

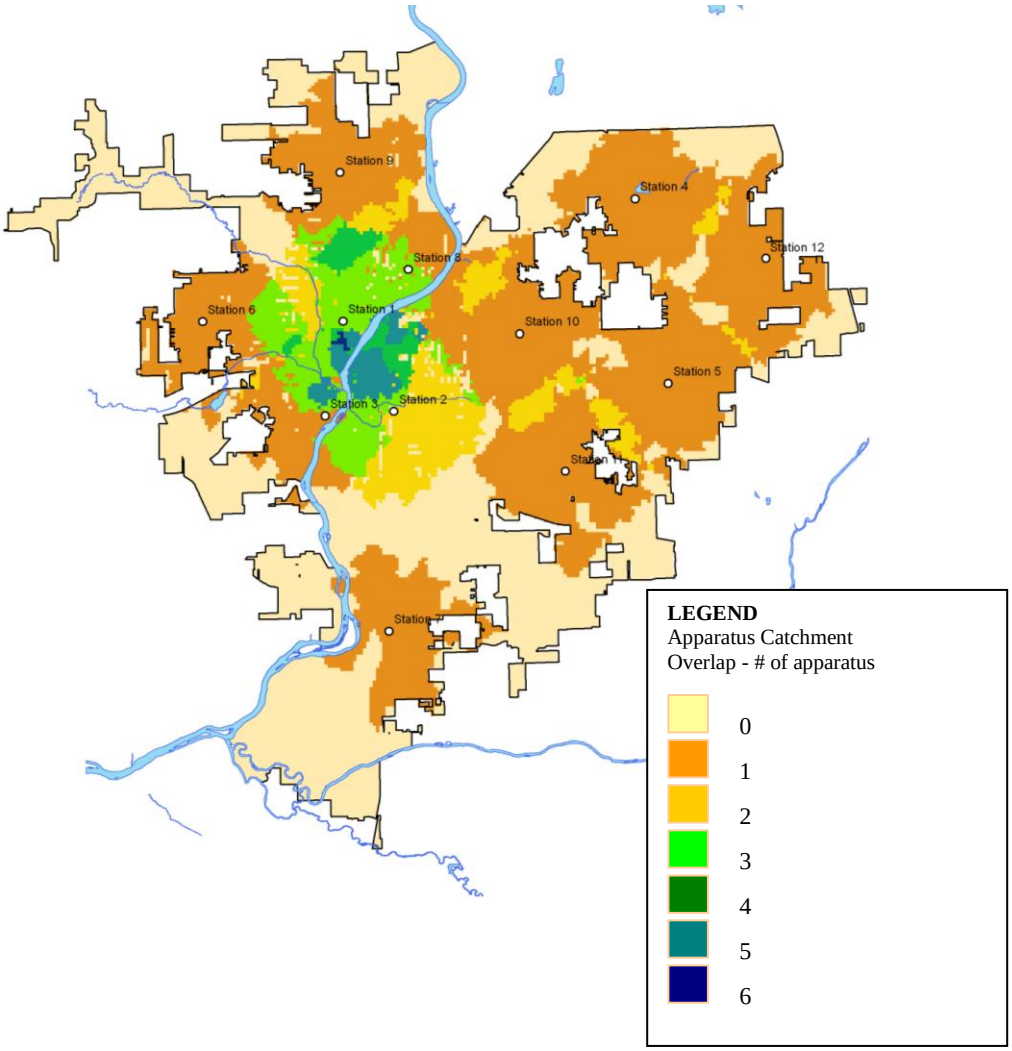
Stations 5 &11 Swath/North and East

The only reasonable solution to address the noncompliant swath situated between Station 5 and 11's still territories is to reposition Station 5 further south and west. Station 5 would be relocated to South Mulford Road and Elaine Drive. The placement of apparatus at this location would completely resolve the current gap of noncompliance between these two still territories. However, the repositioning of Station 5 exacerbates the already existing noncompliant area to the north and east, creating the need for an additional station to cover this area. The Department included an additional station located at Bell School Road and Rote Road to cover the north and east, along with the repositioning of Station 5 on the same catchment map. The maps show vastly improved coverage for both the swath area as well as the north and east areas of the City.

Station 5 Relocation to South Mulford Road and Elaine Drive/
Station 12 Addition to Bell School Road and Rote Road
Four Minute (Travel Time) Catchment Map



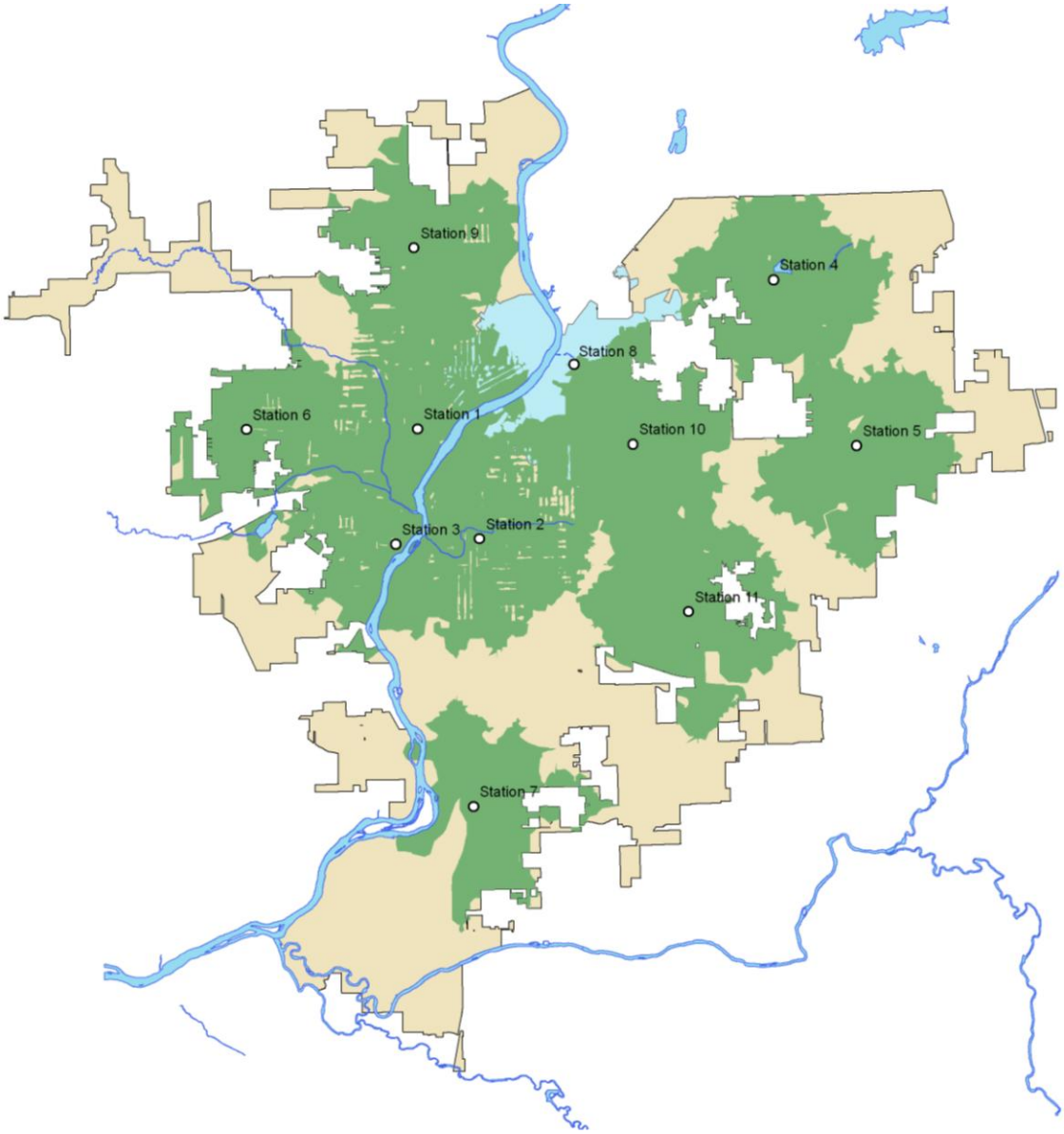
Station 5 Relocation to South Mulford Road and Elaine Drive/
Station 12 Addition to Bell School Road and Rote Road
Apparatus Four-Minute (Travel Time) Catchment Overlap



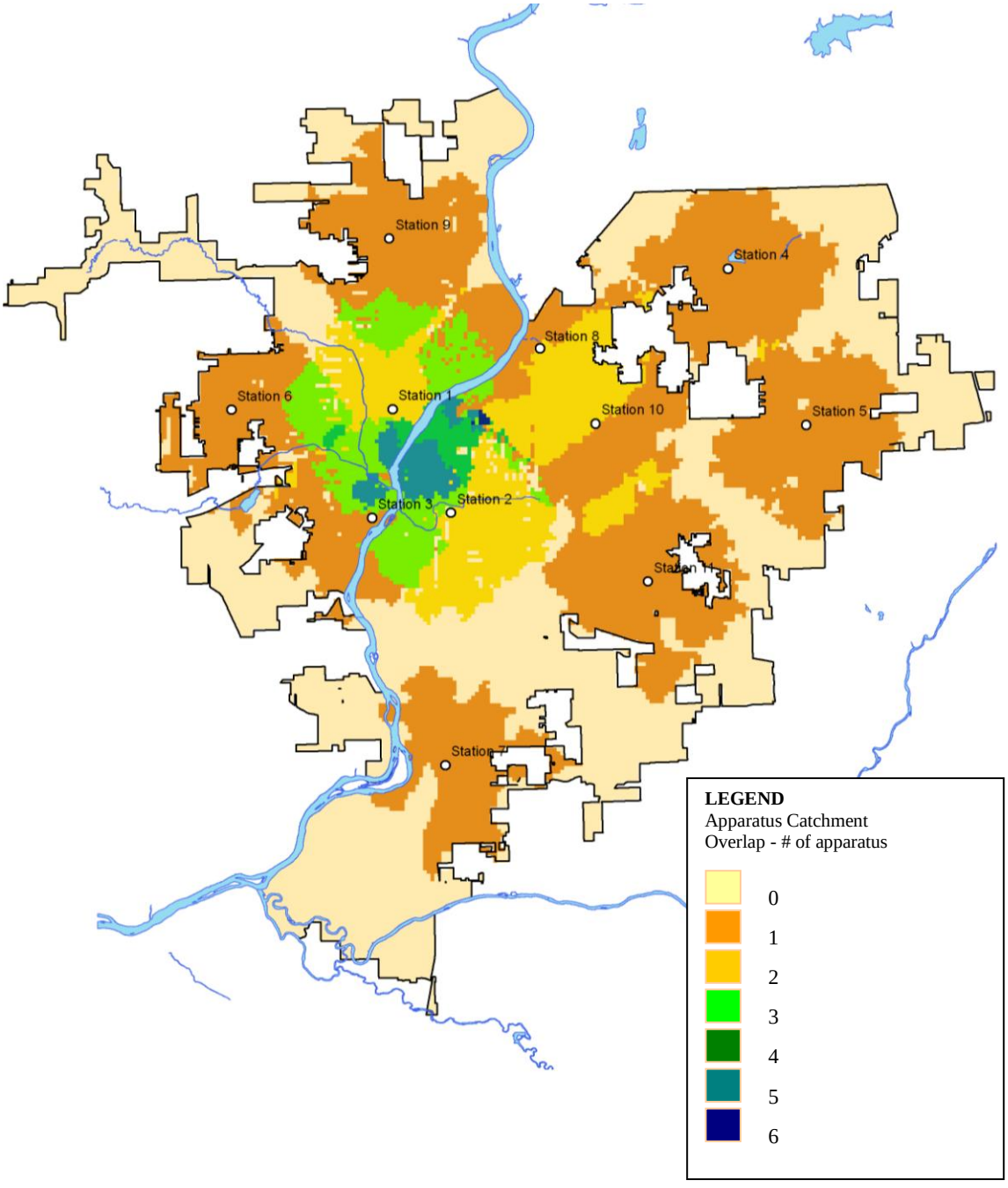
Station 4 Pocket – North and West

Several different scenarios were reviewed in an effort to address the pocket of noncompliance to the north and west of Station 4. The movement of Station 4 to the west (Applewood Lane and Springbrook Road) would have a minimal effect in solving the noncompliance issue, and would be of significant detriment to the northeast. Repositioning Station 8 to the east side of the river (Parkview Avenue and Spring Creek Road area) provides for greater accessibility to this area and the catchment and overlap maps indicate that this move would not significantly diminish coverage to other areas of Station 8's present still territory.

Station 8 Relocation to Parkview Avenue and Spring Creek Road
Four Minute (Travel Time) Catchment Map



Station 8 Relocation to Parkview Avenue and Spring Creek Road
Apparatus Four-Minute (Travel Time) Catchment Overlap



Both maps show response times to the north and west area of Station 4's current still territory would continue to fall outside the travel time benchmark. However, it is believed that with infrastructure improvements - especially pre-emption control of major intersections along Forest Hills Road - would allow for acceptable response times.

Engine 6 Availability

In order to resolve the issue of response noncompliance within Station 6's still territory, the Department should consider will conducting all recruit academy training using reserve apparatus and instructors outside their normal assigned shift hours. This will increase Engine 6's availability for incident response. Improving scheduling and efficiency should allow the academy to operate with minimal financial impact.

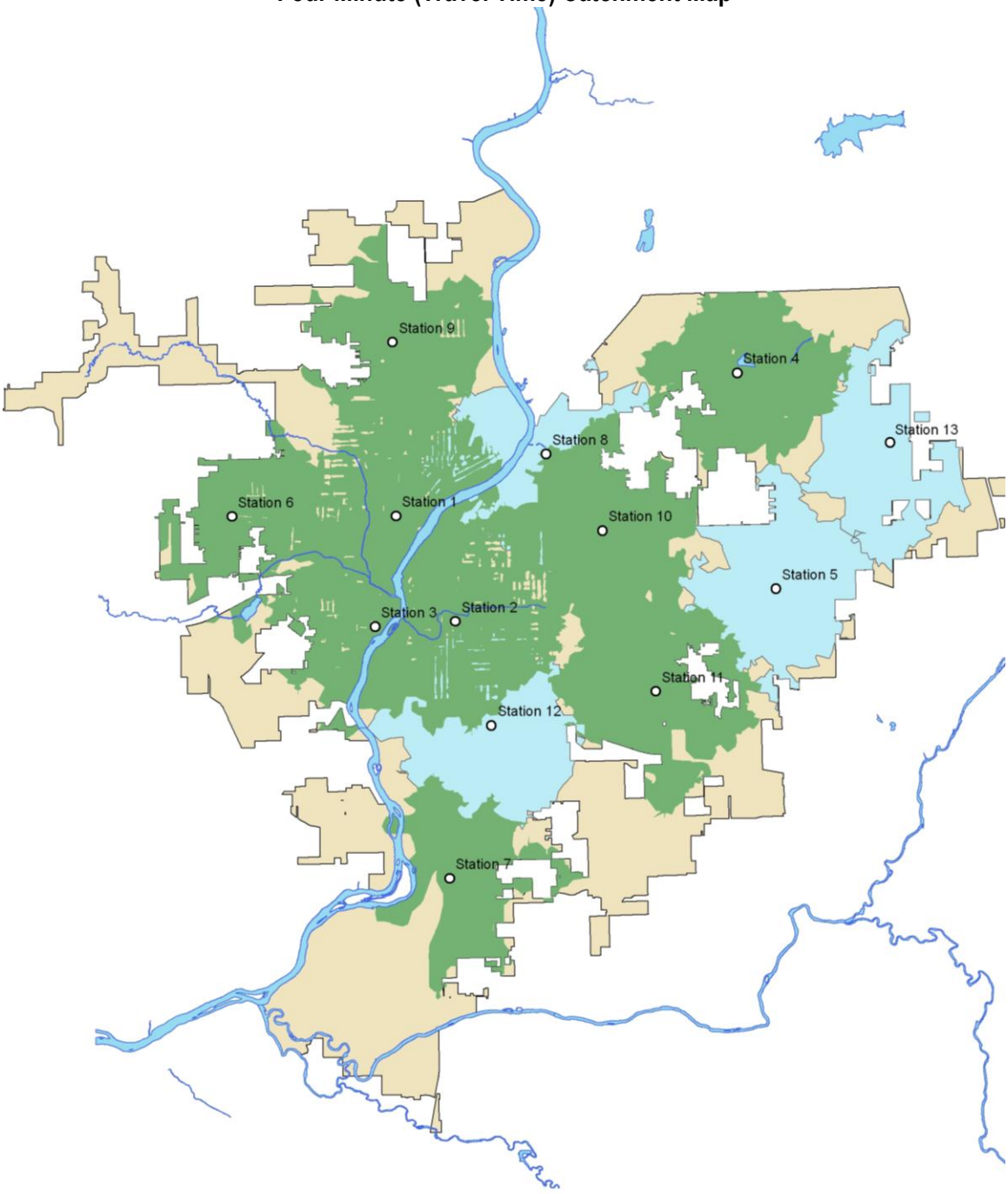
Ambulance Maximum Capacity

The Department's reliability study and utilization calculations show a low percent availability and high unit hour utilization. As discussed above the three ambulances already exceed the maximum capacity, with the remaining two ambulances nearing the threshold range. Statistically, the Department should consider placing two additional ambulances in service. The Department reviewed potential ambulance placement based on distribution and incident frequency. Ambulance distribution would be most optimal if additional ambulances were placed at Stations 5 and 6. Incident frequency would suggest that additional ambulances be placed at Stations 1 and 2. If only one additional ambulance were to be placed in-service, the most optimal location to address both distribution and incident frequency would be to place an ambulance at Station 12 (Harrison Avenue and 11th Street).The decision will be made regarding ambulance placement as funding becomes available.

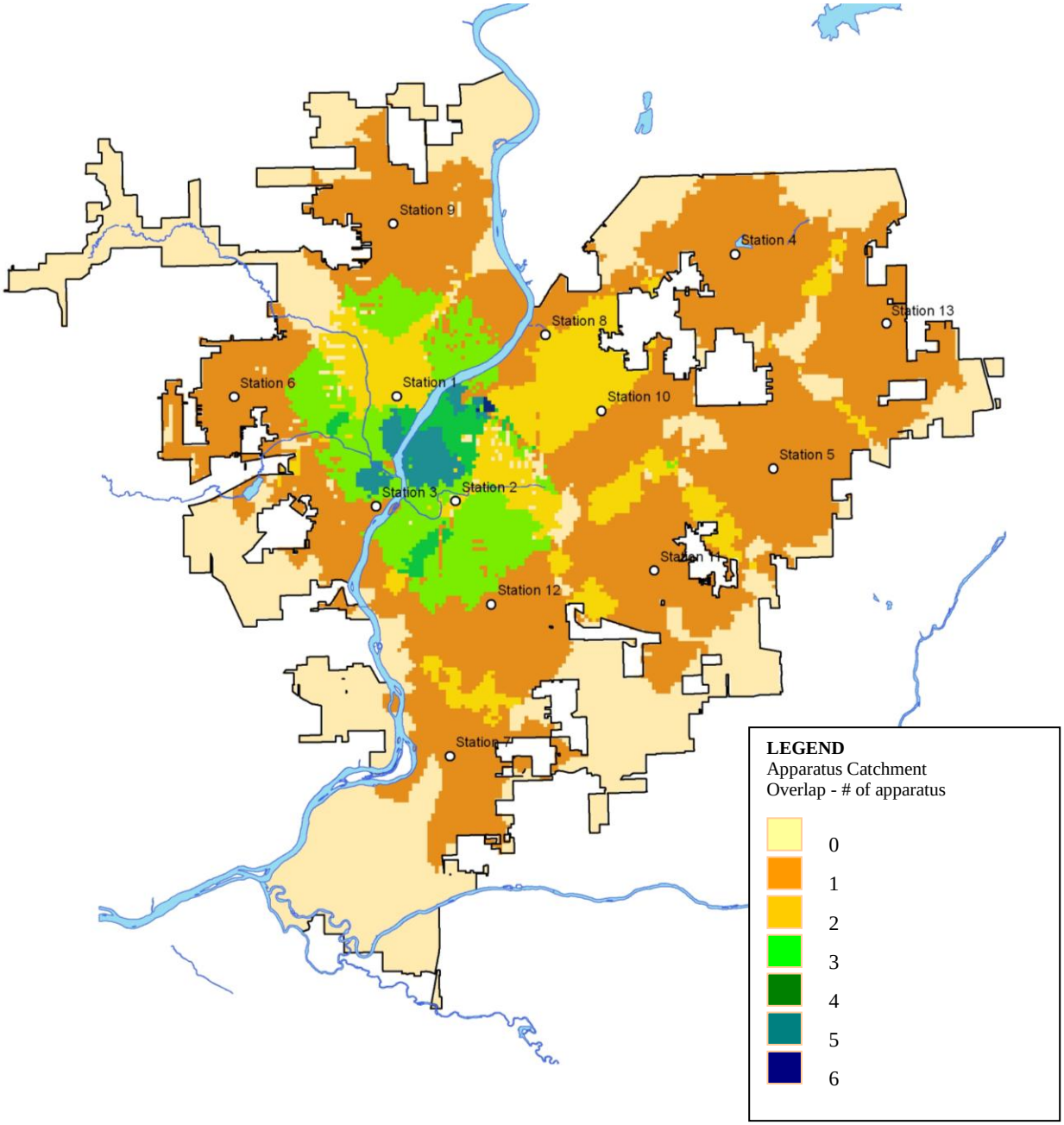
Comprehensive Solution

The Department has developed a comprehensive plan that simultaneously addresses all high incident frequency areas of noncompliance within the jurisdiction. This overall scenario would provide optimum coverage to the City through the following: addressing the confluence area with the addition of Station 12 at Harrison Avenue and 11th Street; addressing the northeast and swath areas with the movement of Station 5 to South Mulford Road and Elaine Drive, and the addition of Station 13 at Bell School Road and Rote Road; addressing the northwest pocket of Station 4's current still territory with the movement of Station 8 to the Spring Creek Road and Parkview Avenue area; and the addition of two ambulances in any of the aforementioned locations. This "Dream" solution would provide equal distribution to all areas of the jurisdiction, redundancy of coverage to high incident frequency areas, and bring ambulance UHU's and percent availability within acceptable levels.

"Dream" Map (Including All Relocations and Additions)
Four Minute (Travel Time) Catchment Map



"Dream" Map (Including All Relocations and Additions)
Apparatus Four-Minute (Travel Time) Catchment Overlap



Summary

The completion of an extensive risk assessment, accumulation of data, evaluation of performance, and analysis of system capabilities has allowed the Department to determine those areas where compliance has been achieved and identify other areas where improvement needs to be made. Specific recommendations regarding training, resource addition and placement, and improved documentation have been developed. Based on a comprehensive reliability study, the Department believes that implementation of proposed recommendations will lead to performance improvement and achievement of stated objectives.

The *Trigger Mechanism Decision Matrix* has been developed as a methodology to assist the Department with identifying weaknesses prior resource exhaustion. The tiered design combines incident frequency, unit hour utilization (UHU), unit availability, and performance gap measurements into one table that assigns possible solutions for each level.

The Department will evaluate system response time performance annually in an effort to make adjustments as needed. It is believed that improved data collection will more accurately represent current performance. As indicated by proposed catchment and overlap maps, the addition and relocation of resources will undoubtedly improve distribution and concentration in the most noncompliant areas of the jurisdiction.

Several different scenarios addressing the areas of noncompliance were reviewed prior to selecting the best for the purposes of recommendation. Factors considered in the selection process include catchment recommendation maps, catchment overlap maps, along with knowledge and familiarity of the jurisdiction. Although only the final recommendations are included in the document, all scenarios reviewed are provided in the appendix (Appendix 6A) to illustrate the wide variety of potential solutions that the Department explored.

Although the Department meets the credible timeframe for travel times for most of the years analyzed in the reliability study, the ultimate goal is to align with NFPA 1710 travel times as both the benchmark and industry standard. However, it is unrealistic to expect that the difference between current performance and benchmark performance would be attained in a short period of time and thus sustained for any extended period of time. In an effort to measure improvement and move toward the NFPA 1710 benchmark, the Department's goal is to bring initial response travel times for all emergency incidents to less than five minutes during 2010.

The Department has already identified and addressed areas where documentation should be improved. A training program is scheduled to be completed in 2010 for all personnel that will include the following: recording NFPA 1710 initial and ERF response time information on all emergency response incidents; accurate incident reporting and its value; understanding the time-stamping process and sentinel events to be recorded; and personnel access to incident statistics through the Department SharePoint website. The Department will also make the *UHU/Fire Station Activity Matrix* table available to all personnel through the Department's SharePoint website.

The accreditation process has provided the Department with a comprehensive evaluation of community risks, stakeholder expectations, and current performance. Specifically, the Standards of Cover has served as a template to develop deployment objectives that "assure responder and citizen safety, enhance community service, are fiscally responsible, and provide a method for measurement." As a result of the process, the Department has identified its strengths and weaknesses, and designed specific performance objectives in an effort to align its delivery of service with industry standards and customer expectations.

The intent of the Department's involvement in the accreditation process, as stated in the Rockford Fire Department mission statement, has been to enhance its ability "to protect the lives and property of the citizens of Rockford from fire, disasters (natural or manmade), terrorist threats, hazardous materials and other emergencies including emergency medical care. Our mission is accomplished by providing "Excellence in Services" in the areas of prevention, education, suppression, advanced life support care and other public safety emergency services to all areas and citizens of our community."

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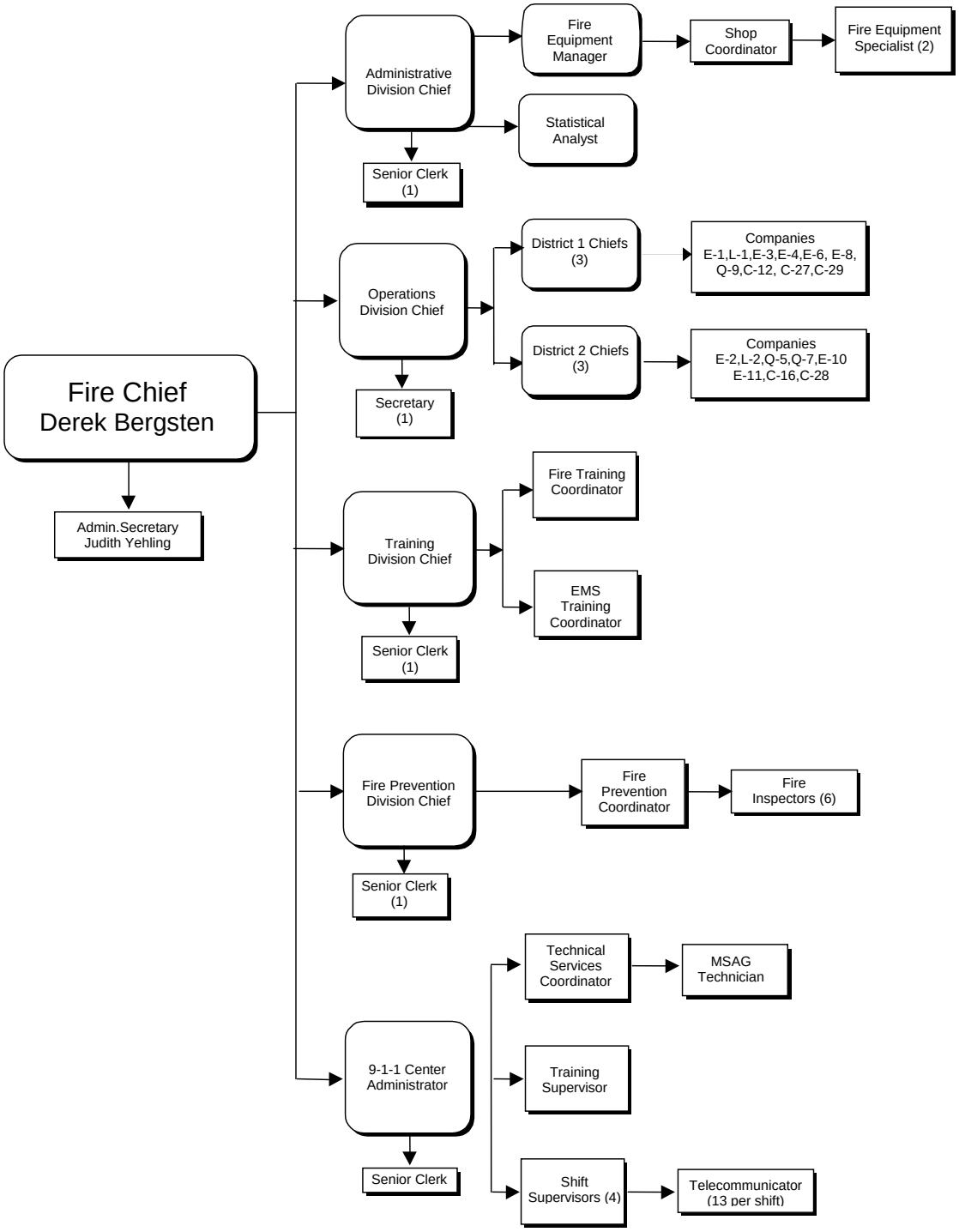
Rockford Fire Department Standard Operating Procedures

2009 Organizational Chart



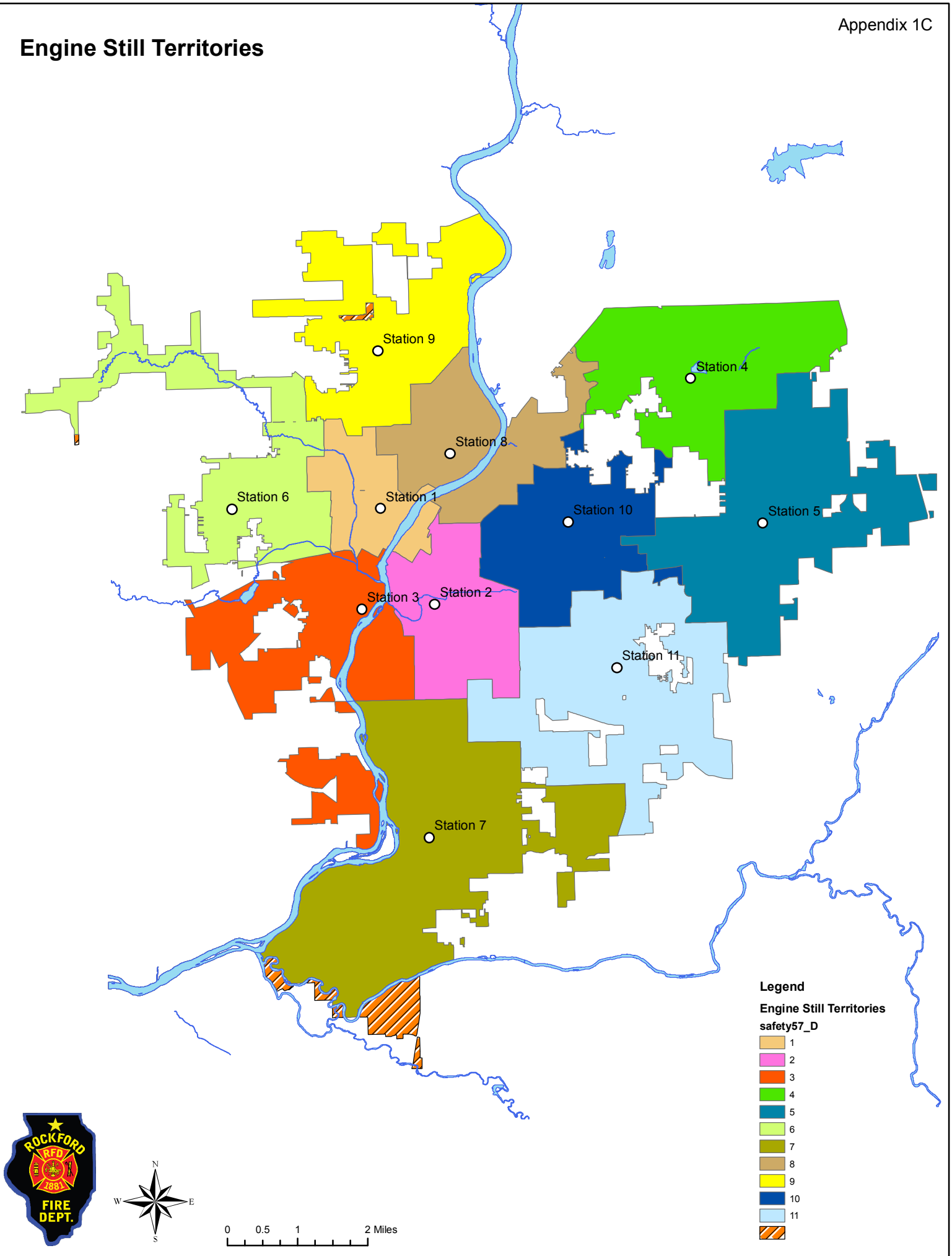
Rockford Fire Department
Deployment Inventory

District 1 – West Side	Front Line Equipment	Daily Staffing	Reserve Equipment
Fire Station #1 528 Woodlawn Avenue 815-987-5671 815-987-5652	**Engine 1,** 1250 gpm 500 gal. water tank (1023) **Ladder 1,** 100' aerial (1261) **District Chief 1** (1308) **Boat 1** (1512)	**E-1 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **L-1 – 4 personnel** 1 – Company Officer 2 – Driver/Engineer 1 – Firefighters **District Chief #1 – 1 person**	**D/C Car** (1304) **Water Rescue 2** (1409)
Fire Station #3 1520 South Main Street 815-987-5669 815-987-5768	**Engine 3,** 1250 gpm, 500 gal. water tank (1028) **1C29** (1421) **Boat 2** (1513)	**E-3 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **1C29 – 2 personnel**	
Fire Station #4 2959 Shaw Woods Drive 815-987-5665 815-987-5614	**Engine 4**, 1250 gpm 500 gal. water tank (1025) **1C12** (1419) **Grass Rig,** (1760) **Auxiliary Light Unit** (1516)	**E-4 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **1C12 – 2 personnel**	**1C40** (1414) **Engine 1020** – 1000 GPM, 500 gal. (1020)
Fire Station #6 3329 West State Street 815-987-5666 815-987-5695	**Engine 6,** 1250 gpm 500 gal. water tank (1026)	**E-6 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters	**Quint 1259**, 1250 gpm, 300 gal. water tank, 75' aerial (1259)
Fire Station #8 505 Sherman Street 815-987-5670 815-987-8085	**Engine 8,** 1000 gpm, 500 gal. tank (1022)	**E-8 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters	
Fire Station #9 2416 Halsted Road 815-987-5673 815-987-8082	**Quint 9,** 1250 gpm, 400 gal. water tank 105' aerial (1258) **1C27** (1420)	**Q-9 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **1C27- 2 personnel**	**1C66** (1417) **1C15** (1413) **1C26** (1415)

District 2 – East Side	Front Line Equipment	Daily Staffing	Reserve Equipment
Fire Station #2 1004 Seventh Street 815-987-5668 815-987-8084	**Engine 2,** 1250 gpm 500 gal. water tank (1024) **Ladder 2,** 109' aerial (1263) **District Chief 2** (1310) **Water Rescue 1** (1558)	**E-2 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **L-2 – 4 personnel** 1 – Company Officer 2 – Driver/Engineer 1 – Firefighters **District Chief #2 – 1 person**	
Fire Station #5 326 North Trainer Road 815-987-5555 815-987-5554	**Quint 5,** 1500 gpm, 400 gal. water tank 105' aerial (1260) **Haz-Mat Unit** (1503/1309) **MABAS 8 – Decon Unit**(1504)	**Q-5 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters	
Fire Station #7 4979 Falcon Road 815-987-5676 815-987-8081	**Quint 7,** 1500 gpm, 400 gal. water tank 105' aerial (1262) **Emergency 1 – ARFF** 1950 gpm, 3000 gal. water tank, 420 gal AFFF foam, 500 lb. Halotron, 55" snozzle. **Emergency 2 – ARFF** 150 gal. foam/water tank, 500 purple K	**Q-7/ARFF – 6 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **Emergency 1 – 1 Dr./Eng** **Emergency 2 –** **1 Firefighter**	**Emergency 4** – ARFF, 1000 gpm, 1500 water tank, 180gal AFFF Foam tank **Quint 1257**, 1500 gpm, 400 gal. water tank 105' aerial **Engine #17**, 1000 gpm, 500 gal. water tank (1009) **Engine #16**, 1000 gpm, 500 gal. water tank (1019) **Stake Bed/Utility (**1520) **Fire Safety Trailer** (1518)
Fire Station #10 3407 Rural Street 815-987-5675 815-987-8085	**Engine 10,** 1250 gpm, 500 gal. water tank(1027) **1C16** (1418)	**E-10 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **1C16 – 2 personnel**	
Fire Station #11 2117 Calgary Court 815-987-5672	**Engine 11,** 1000 gpm**,** 500 gal water tank (1021) **1C28** (1417) **Rescue 1 – TRT Unit** (1501)	**E-11 – 4 personnel** 1 – Company Officer 1 – Driver/Engineer 2 – Firefighters **1C28 – 2 personnel**	
RFD Maintenance & Repair Facility 2323 Sawyer Road 815-987-5655	**Pick-up** (1307) **Suburban** – 1988 (1302) **Suburban** – 1994 (1305) **Suburban** – 1998 (1306)	**3 personnel** 1 – Shop Coordinator 2 – Mechanics	
Off-Site Storage	**Ladder 1253,** 75' aerial (1253) **REHAB 1,** Bus, (1519)		

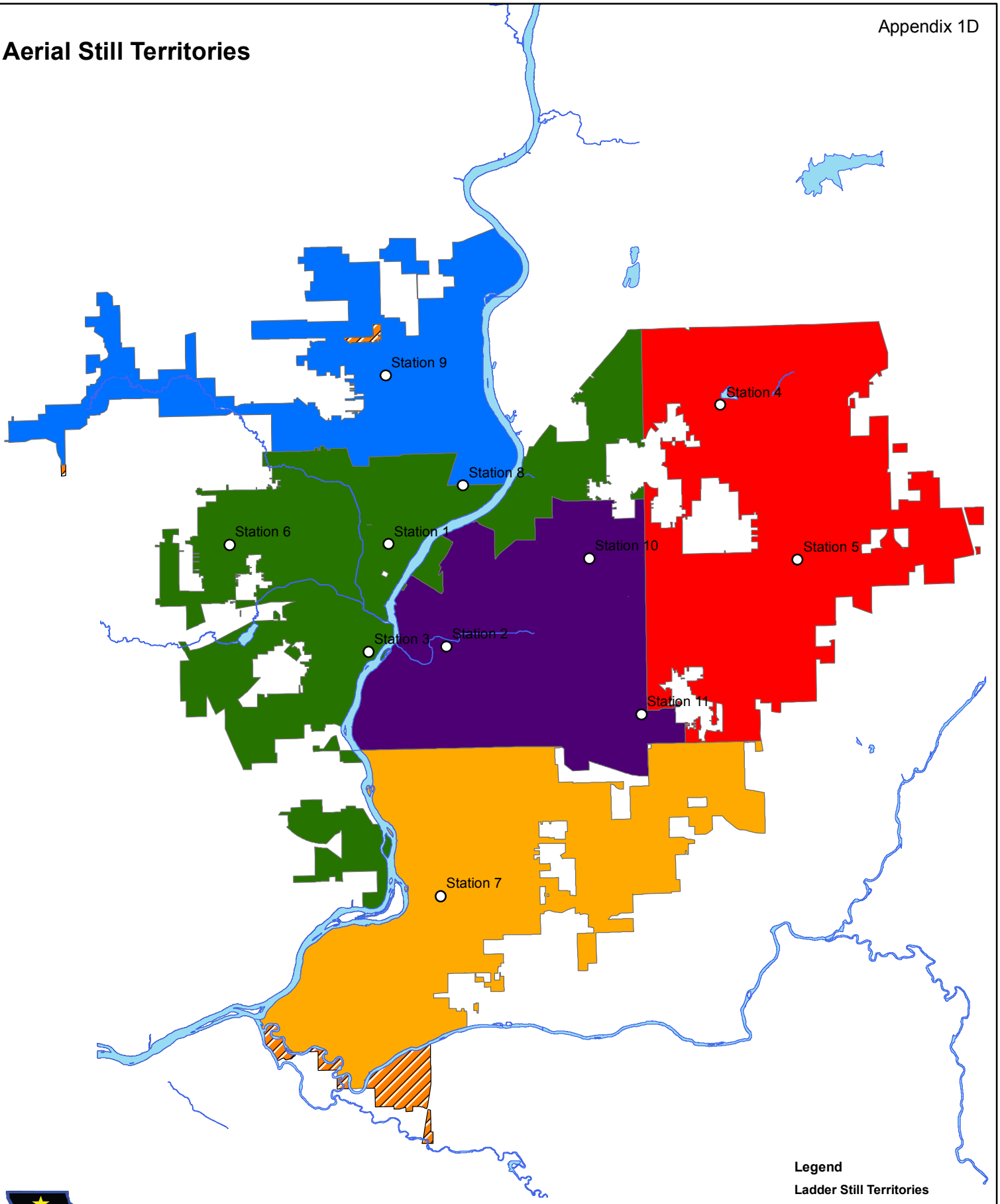
Appendix 1C

Engine Still Territories



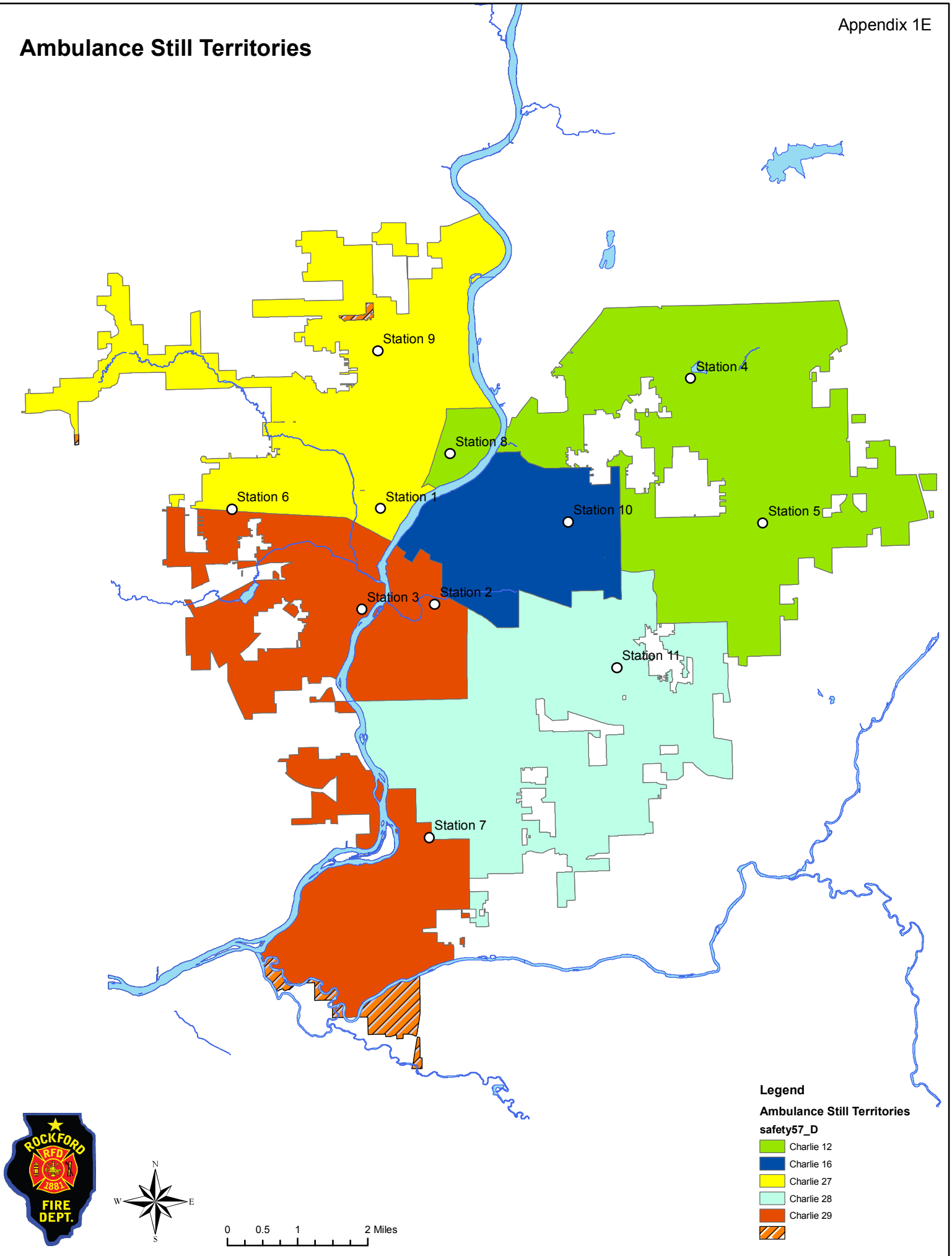
Appendix 1D

Aerial Still Territories



Appendix 1E

Ambulance Still Territories



Customer Centered Strategic Plan

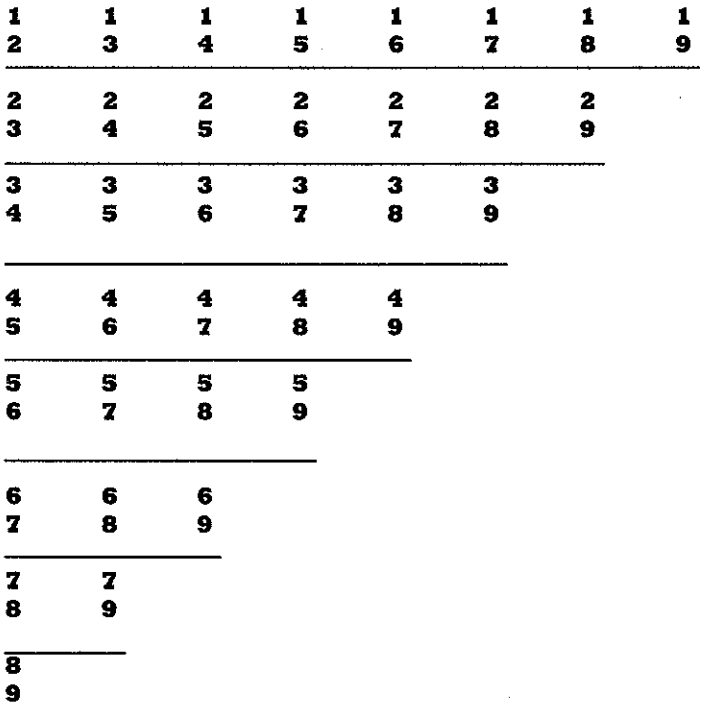
Prioritization of Services

Listed below are the services that the Rockford Fire Department will be evaluating during the strategic planning process. We will take a moment before we ask you to prioritize these items (through a direct comparison process) to explain the services so you have a good understanding of each.

Once this explanation is given, please compare each service against the others, circling the service that you feel is more important in each instance. The facilitator will give you an example.

SERVICES

1. Fire suppression (any type of fire extinguishment, i.e. buildings, vehicles, natural cover)
2. Basic rescue (vehicle extrication, machinery entrapment)
3. Advanced rescue (confined space, high-angle, water, trench, collapse)
4. Advanced Life Support emergency medical services (ALS – Paramedic Service)
5. Fire inspections (fire code enforcement in occupancies)
6. Fire investigation (fire cause and origin determination and investigation)
7. Hazardous materials mitigation (dangerous substances threatening life or environment)
8. Community Fire/EMS Safety Education (public education activities)
9. Response to Weapons of Mass Destruction/Bioterrorism (response to terrorist action)



1	2	3	4	5	6	7	8	9

Rockford Fire Department – CUSTOMER INPUT

The Rockford Fire Department is developing a comprehensive customer centered strategic plan. Input from you, the "customer", is a critical component of this process. Please take some time to fill out the information requested below. Your responses will be held in strict confidence.

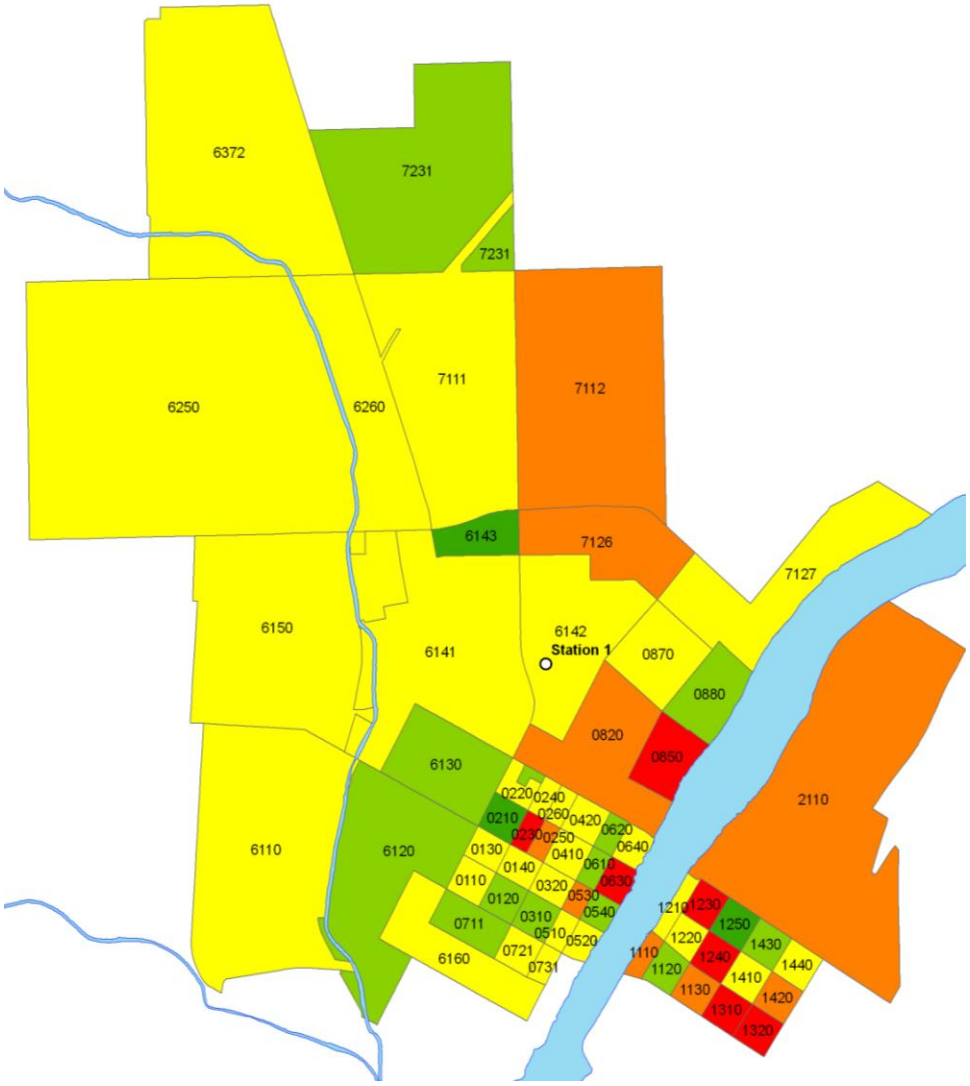
Please list, in priority, the expectations you have of your fire department:

Please list any concerns you have regarding your fire department:

Please list any positive feedback or strengths you would like to share regarding your fire department:

Please list any general remarks you may have for your fire department (continue on back if needed):

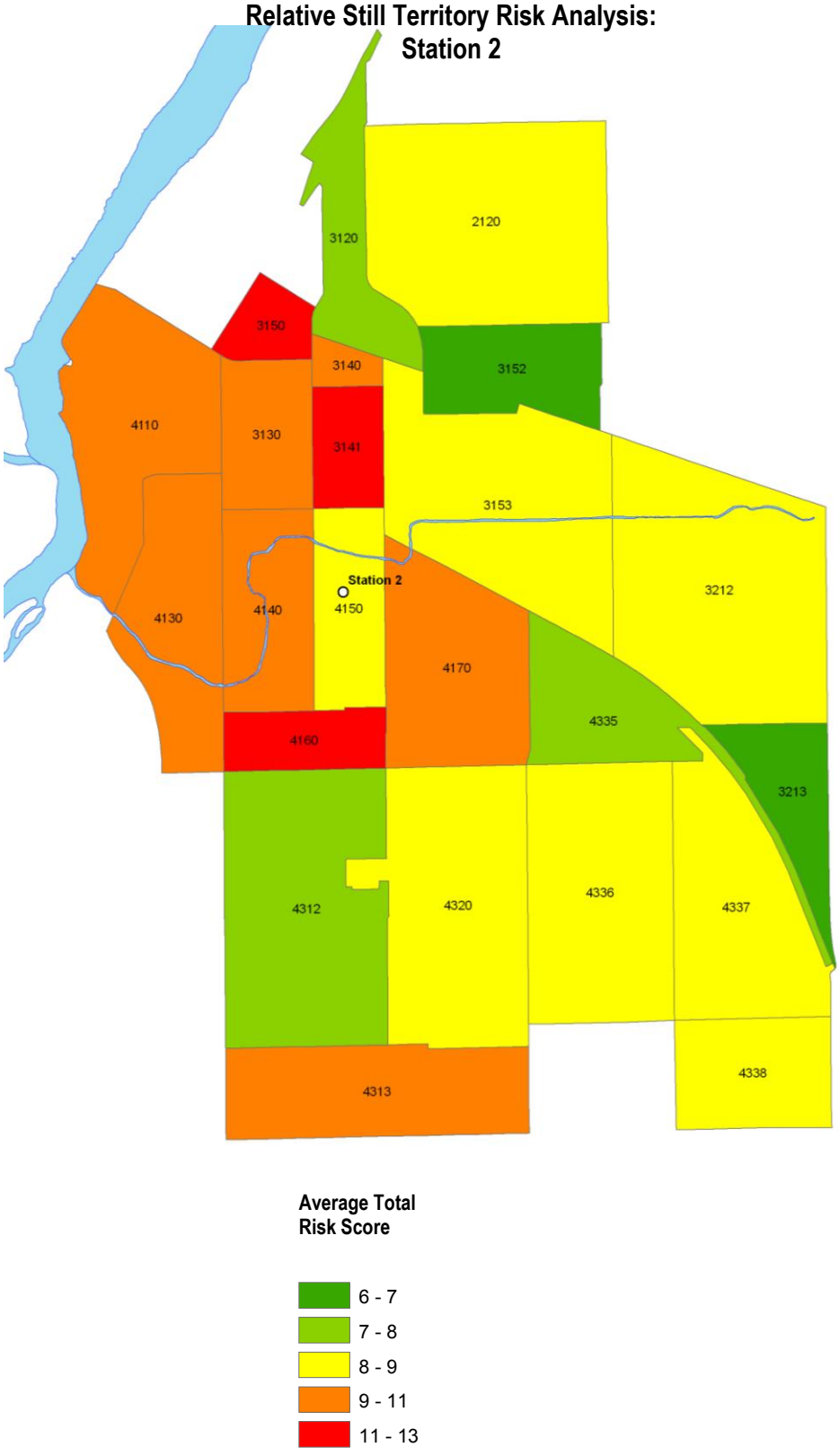
Relative Still Territory Risk Analysis: Station 1



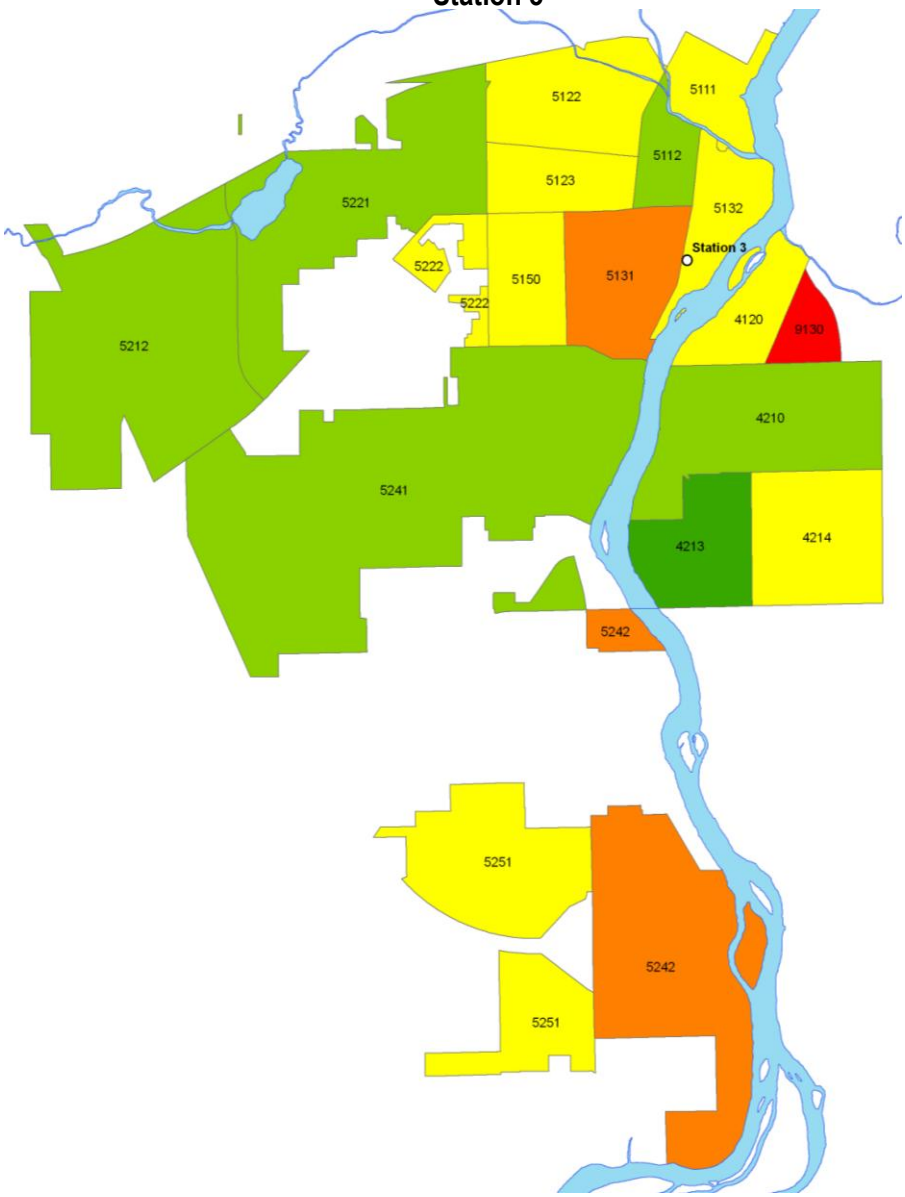
Average Total Risk Score

- 4 - 5
- 5 - 8
- 8 - 10
- 10 - 12
- 12 - 15

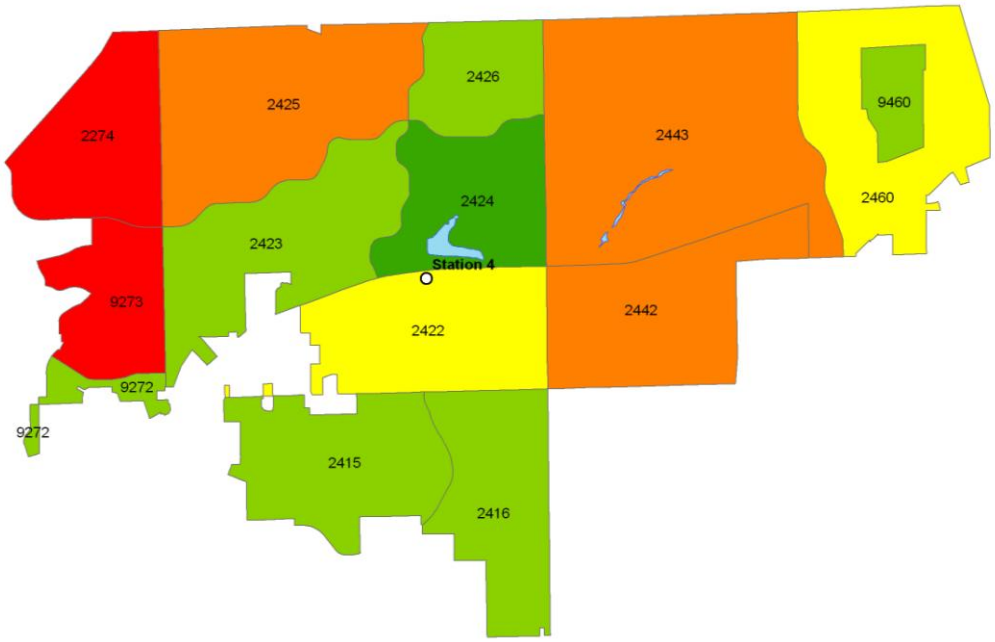
Relative Still Territory Risk Analysis: Station 2



Relative Still Territory Risk Analysis:
Station 3



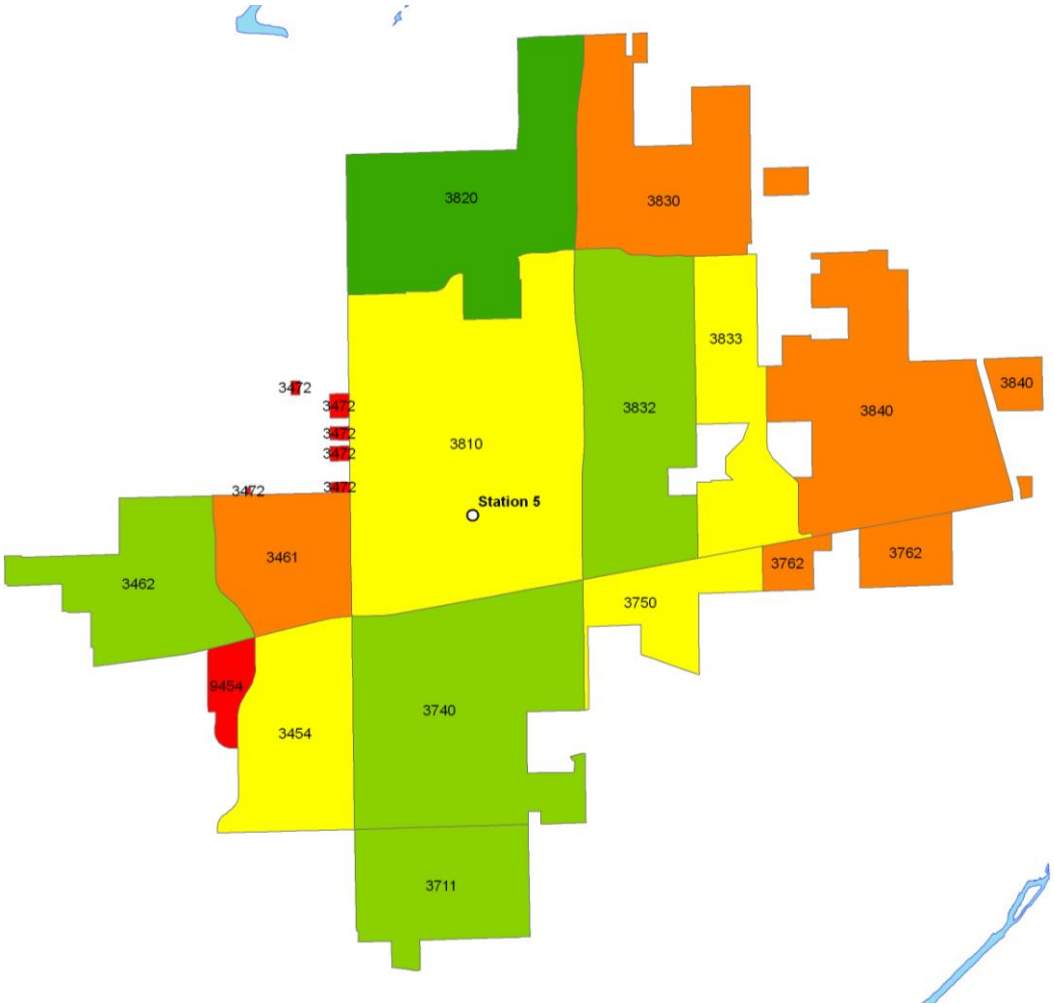
Relative Still Territory Risk Analysis: Station 4



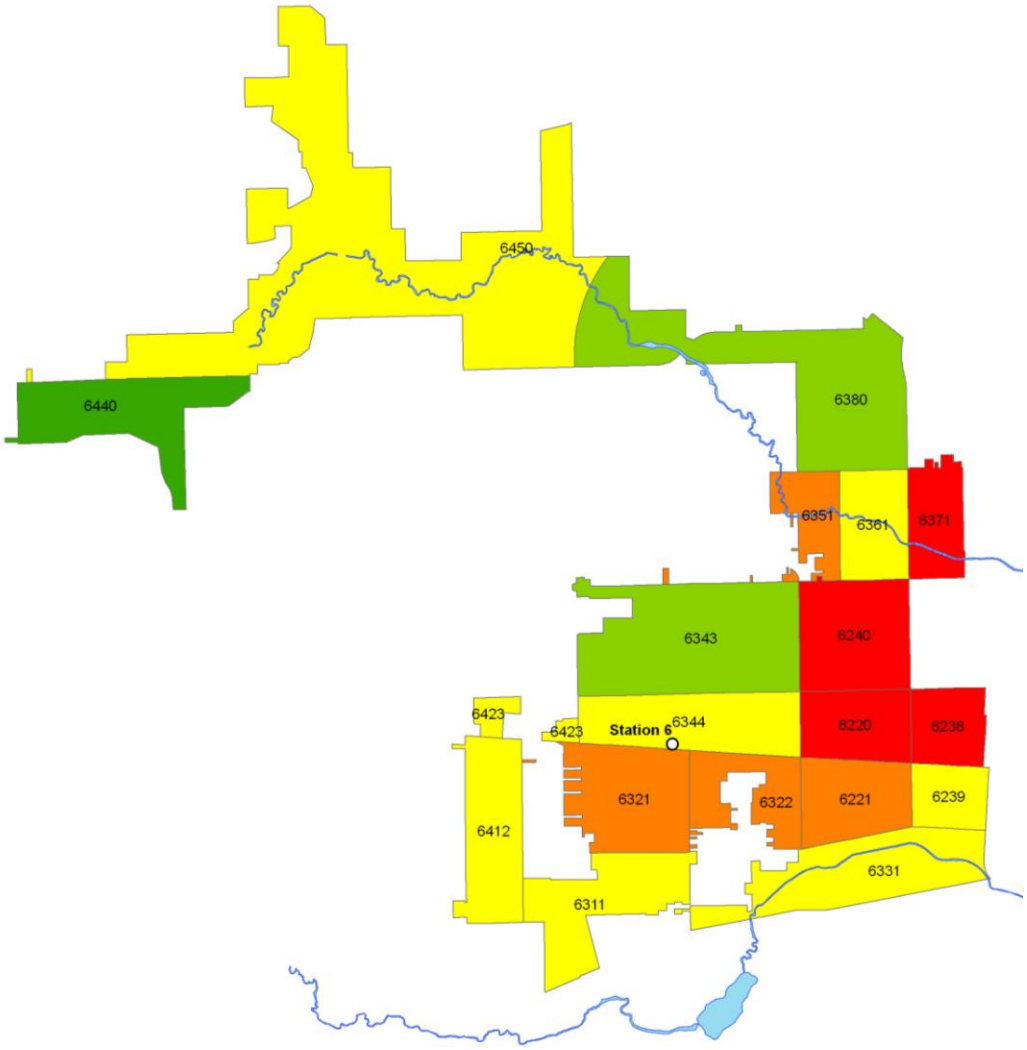
Average Total Risk Score

- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 10

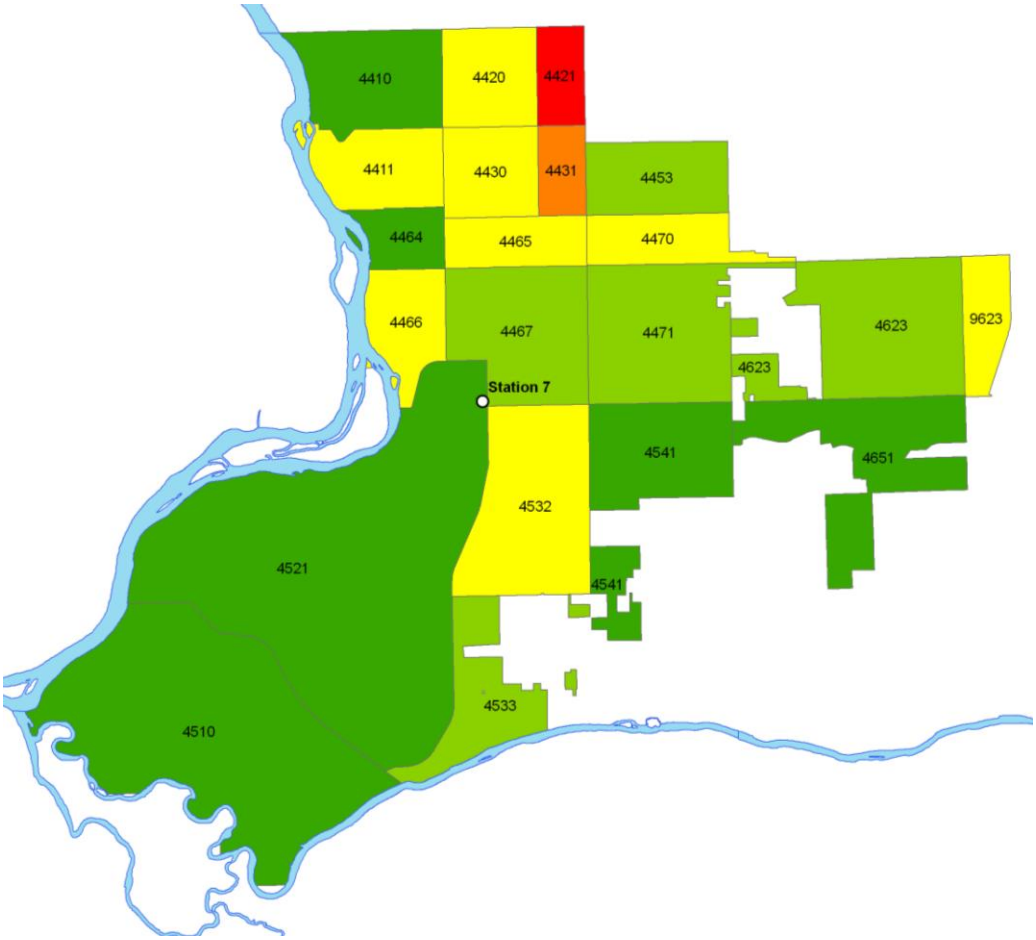
Relative Still Territory Risk Analysis:
Station 5



Relative Still Territory Risk Analysis:
Station 6



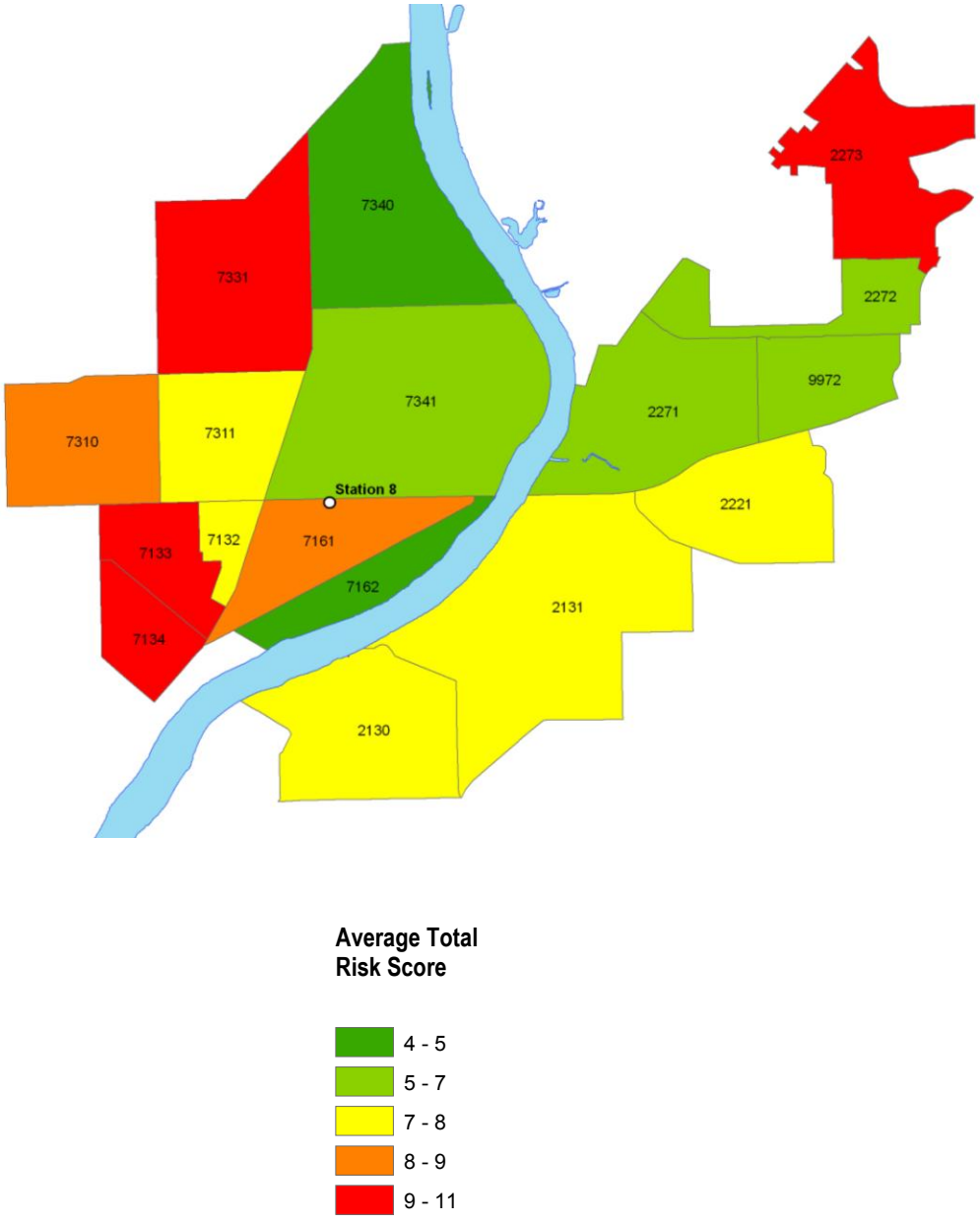
Relative Still Territory Risk Analysis:
Station 7



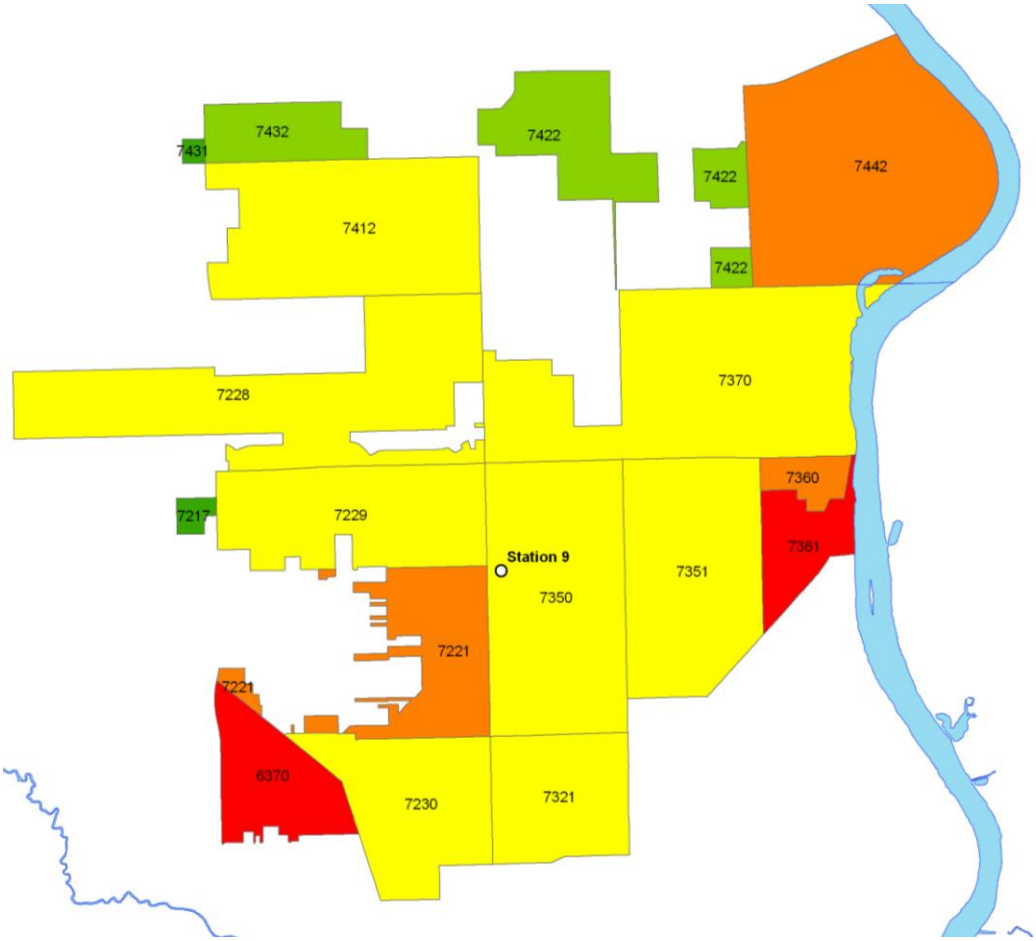
Average Total Risk Score

- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 11
- 11 - 12

Relative Still Territory Risk Analysis: Station 8



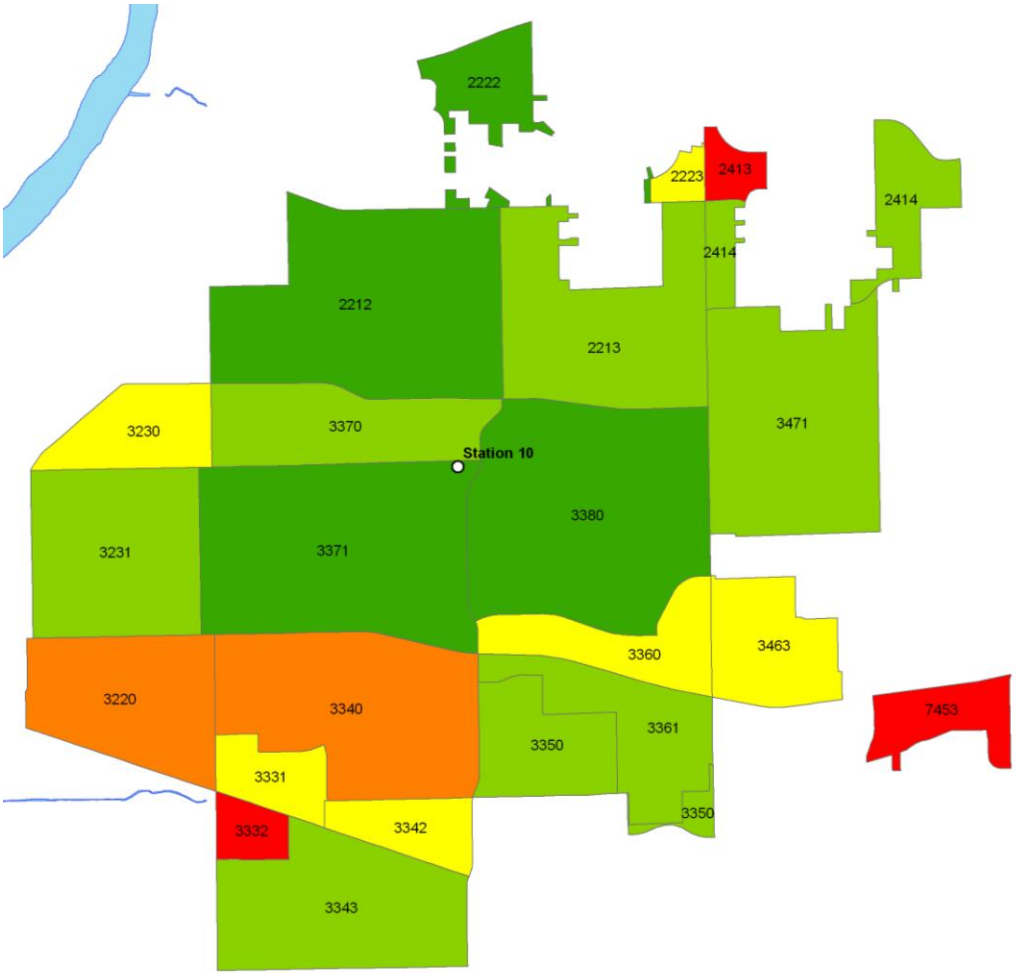
Relative Still Territory Risk Analysis:
Station 9



Average Total Risk Score

- 3 - 4
- 4 - 6
- 6 - 7
- 7 - 8
- 8 - 11

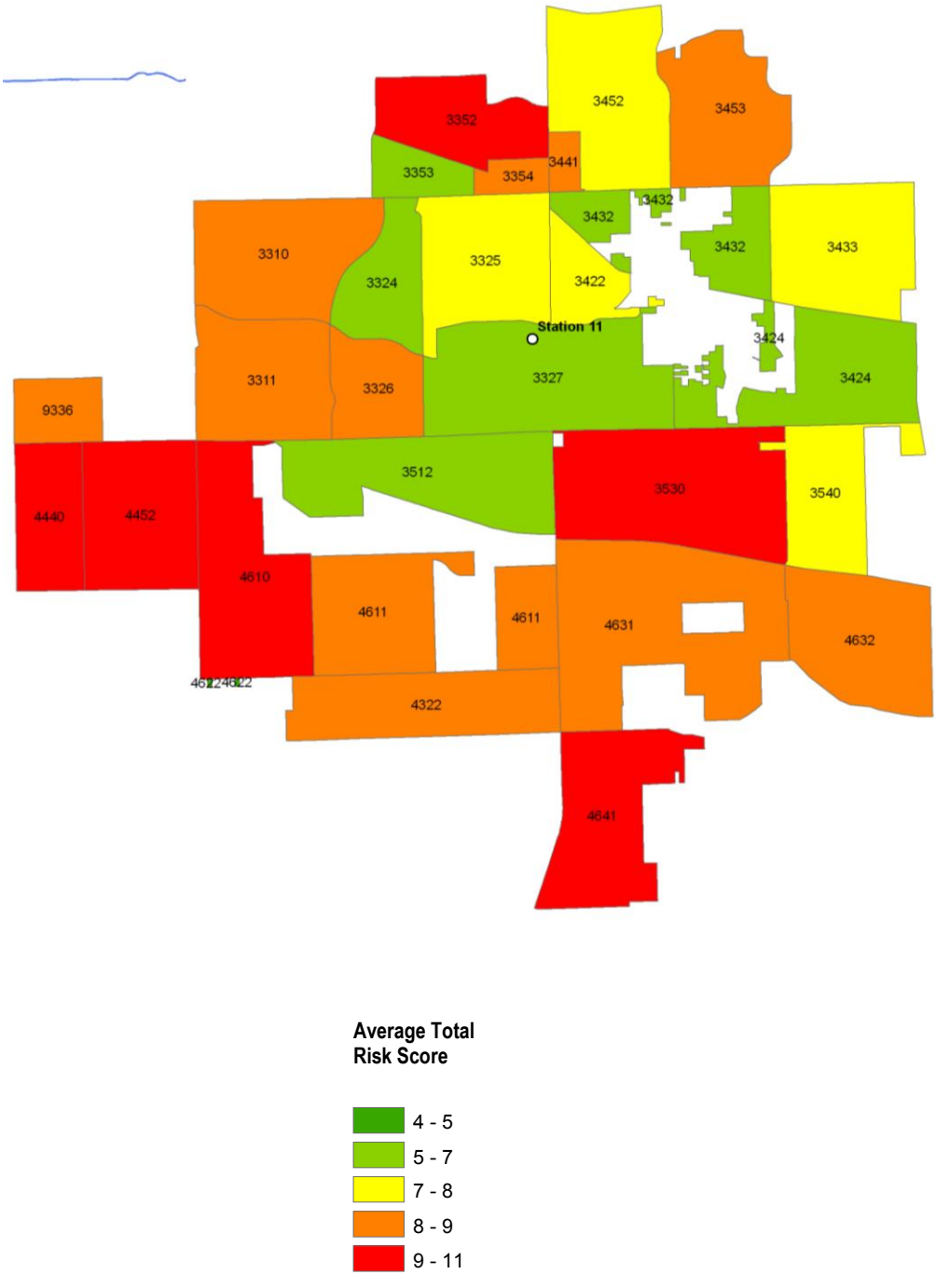
Relative Still Territory Risk Analysis:
Station 10



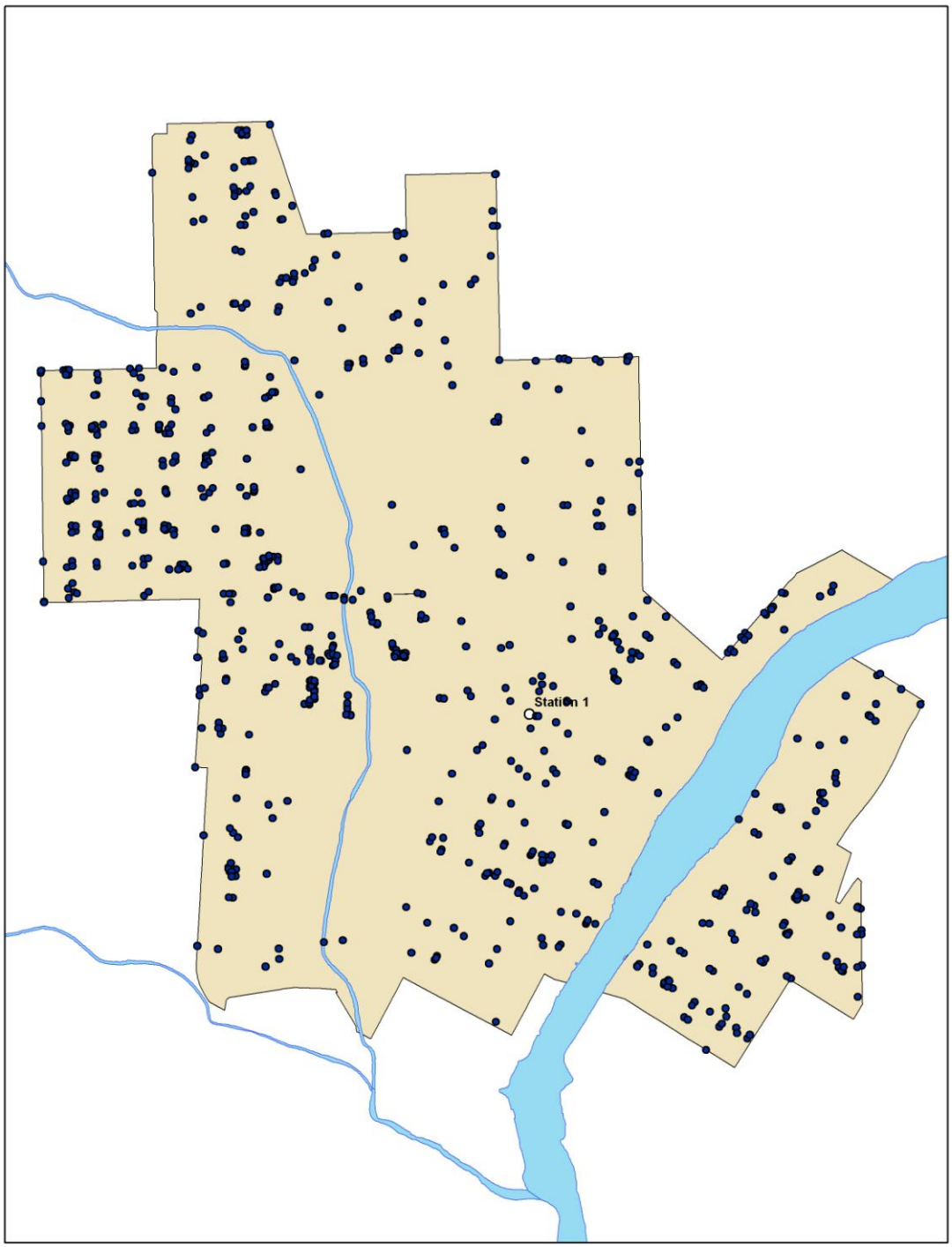
Average Total Risk Score

- 5 - 6
- 6 - 8
- 8 - 9
- 9 - 10
- 10 - 12

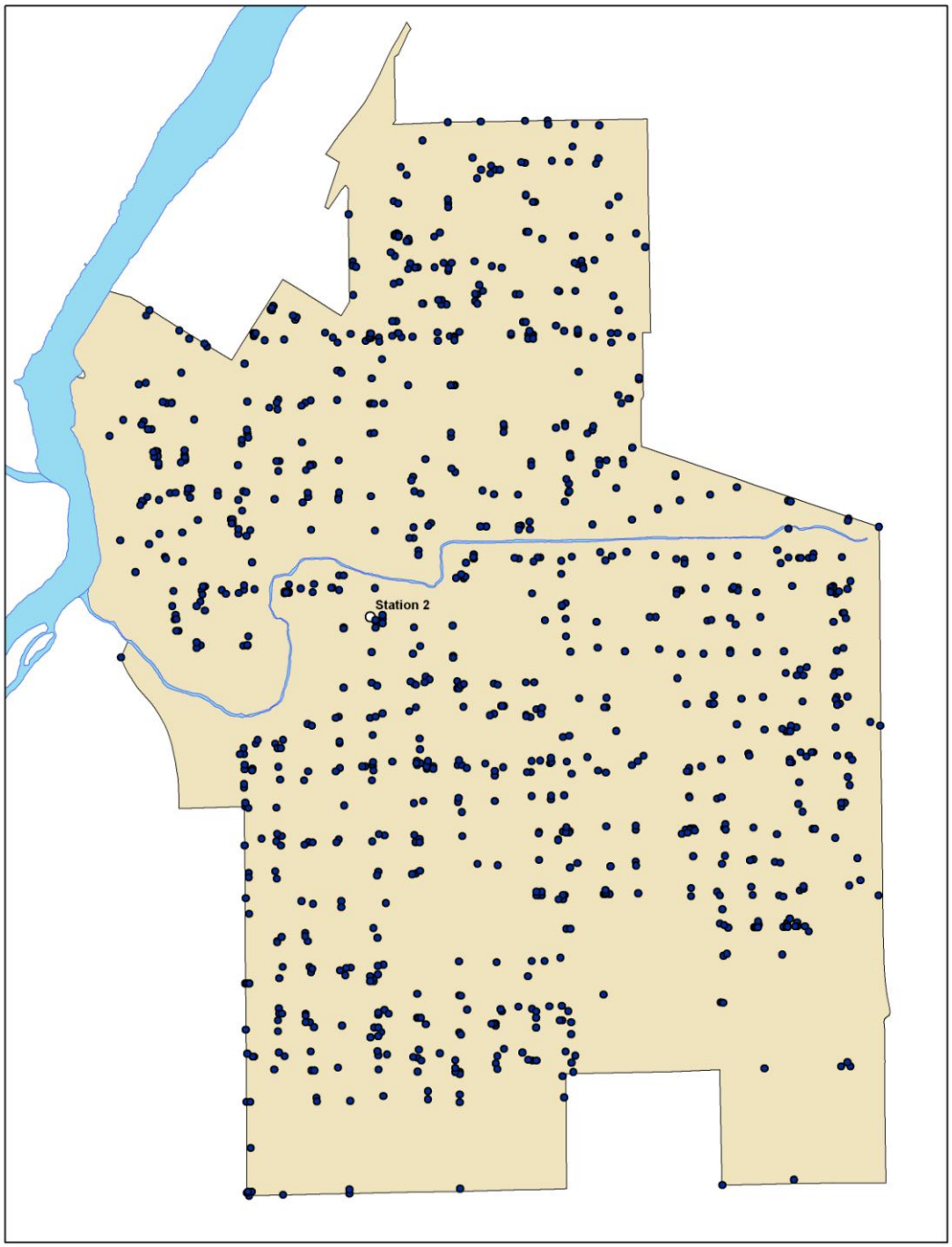
Relative Still Territory Risk Analysis:
Station 11


3352
3452
3453
3353
3354
3441
3432
3310
3324
3325
3422
3433
Station 11
3424
3311
3326
3327
9336
3512
3530
3540
4440
4452
4610
4611
4611
4631
4632
4322
4641
Average Total Risk Score
4 - 5
5 - 7
7 - 8
8 - 9
9 - 11

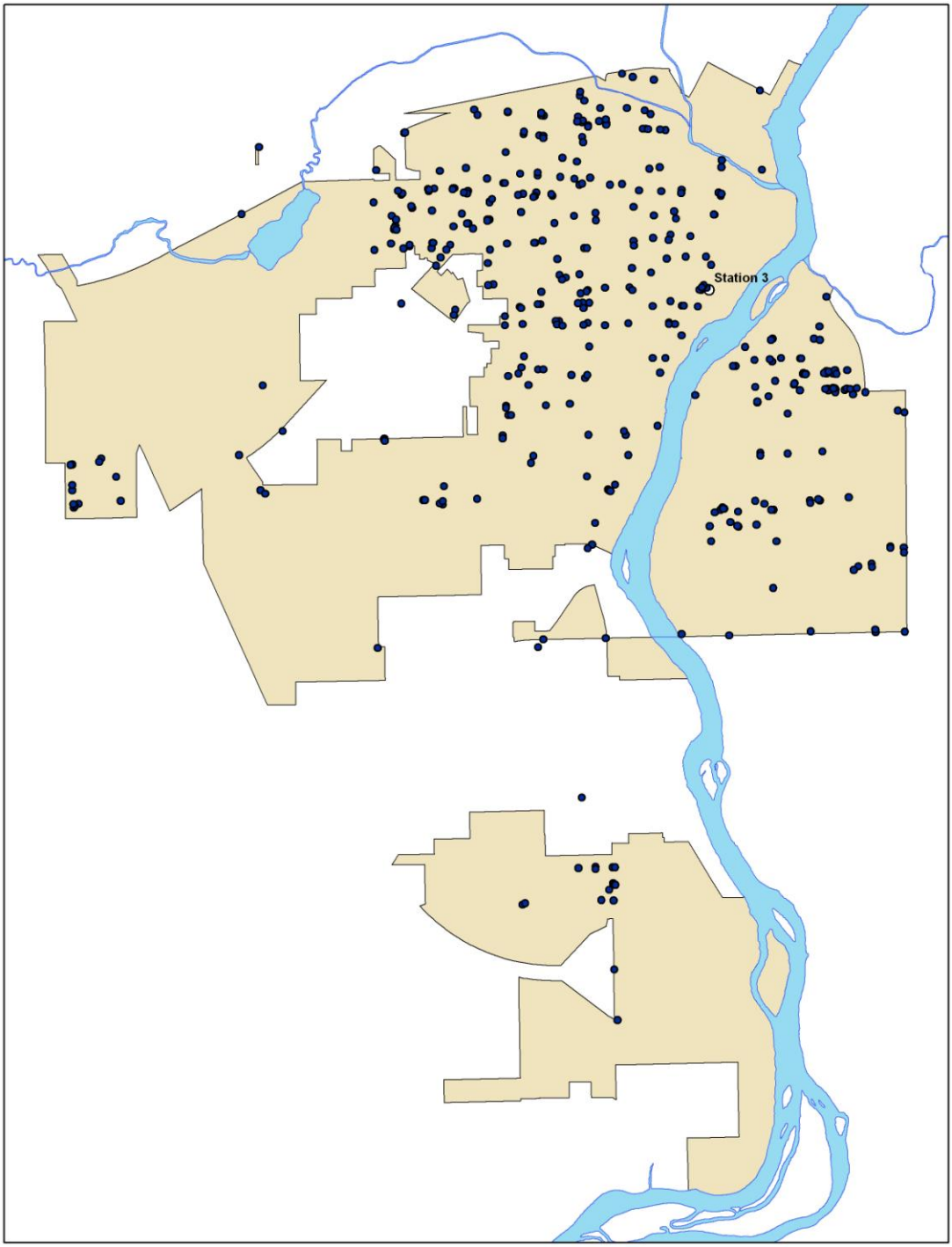
Station #1: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(1227 Incidents)



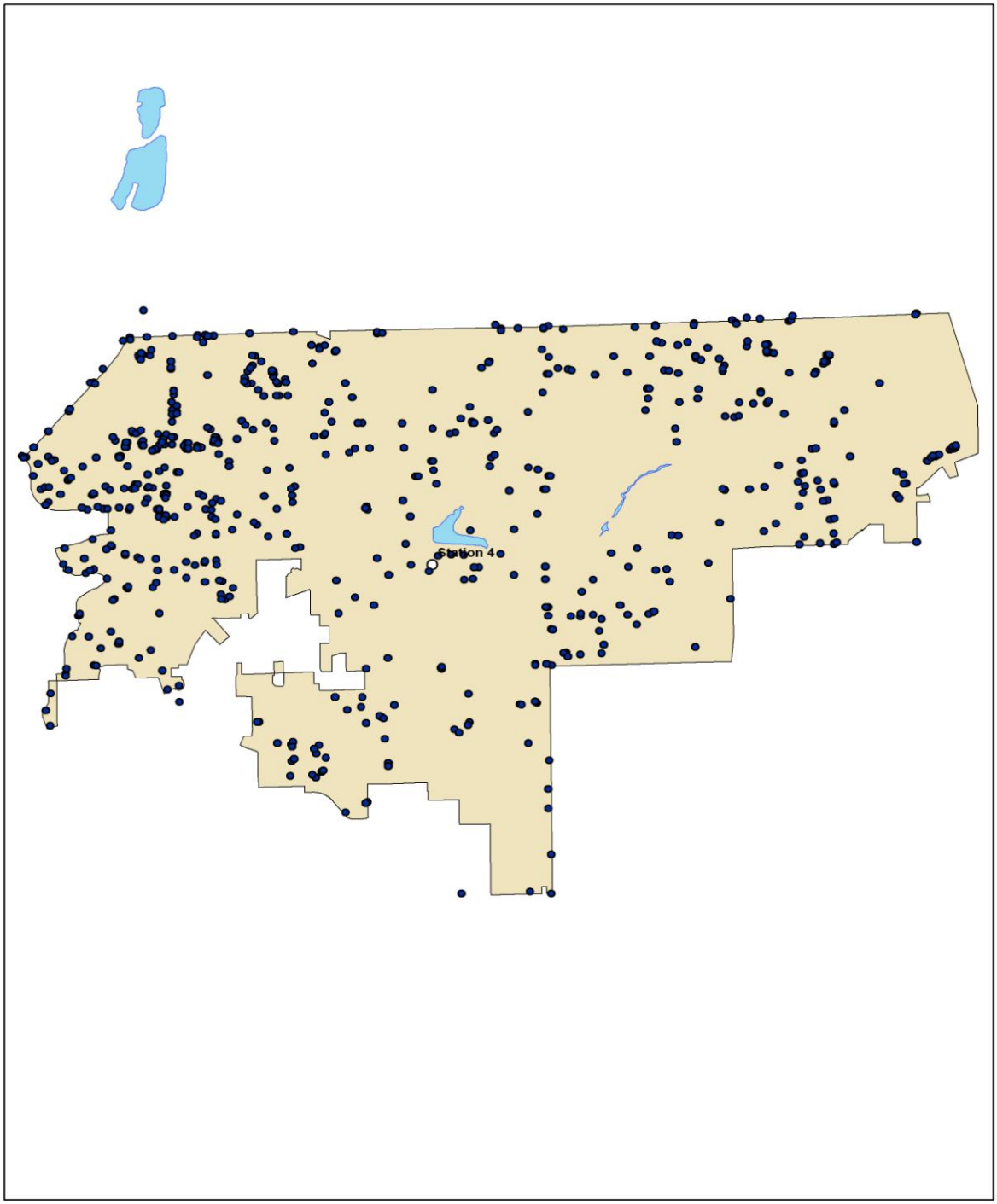
Station #2: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(1579 incidents)



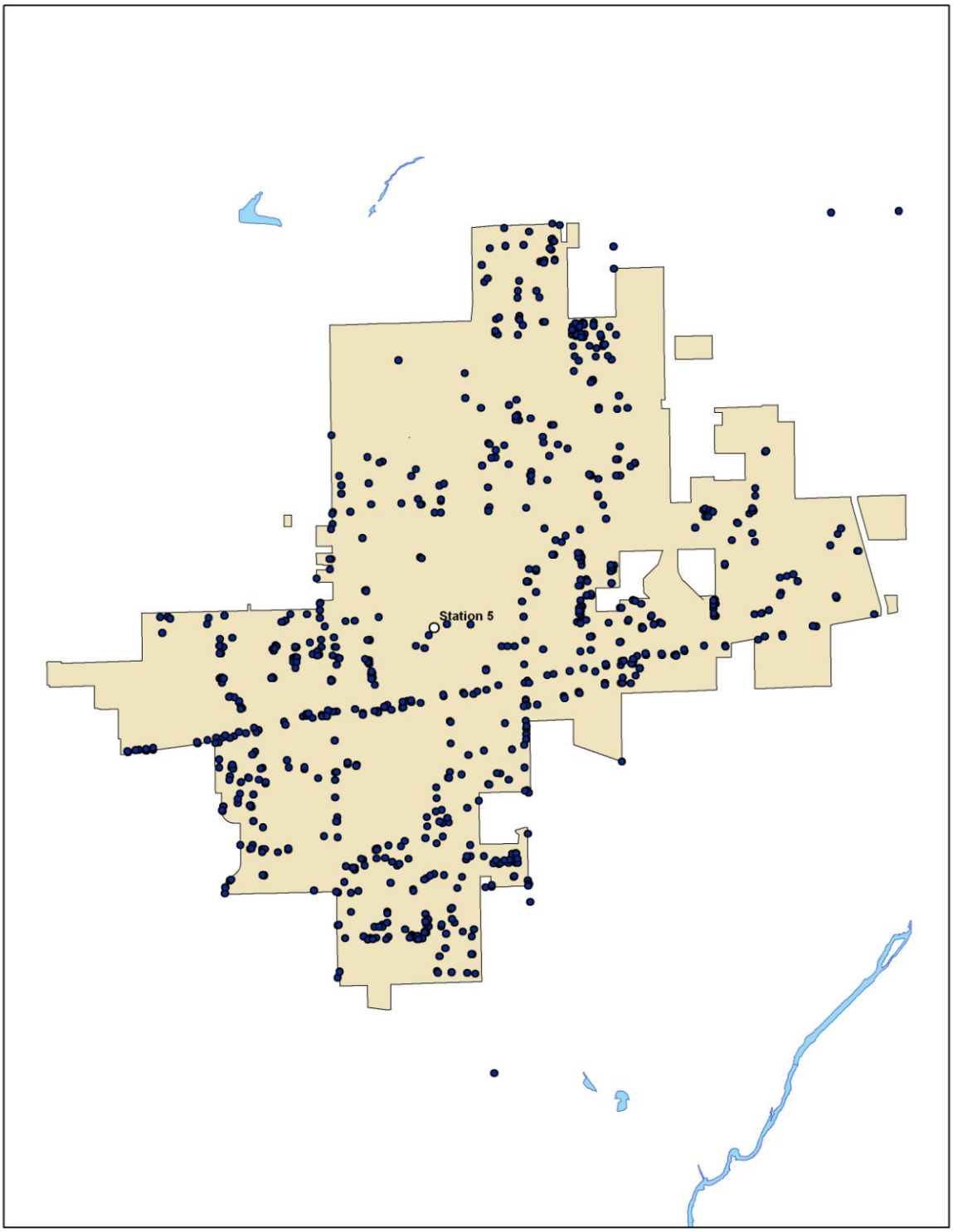
Station #3: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(531 Incidents)



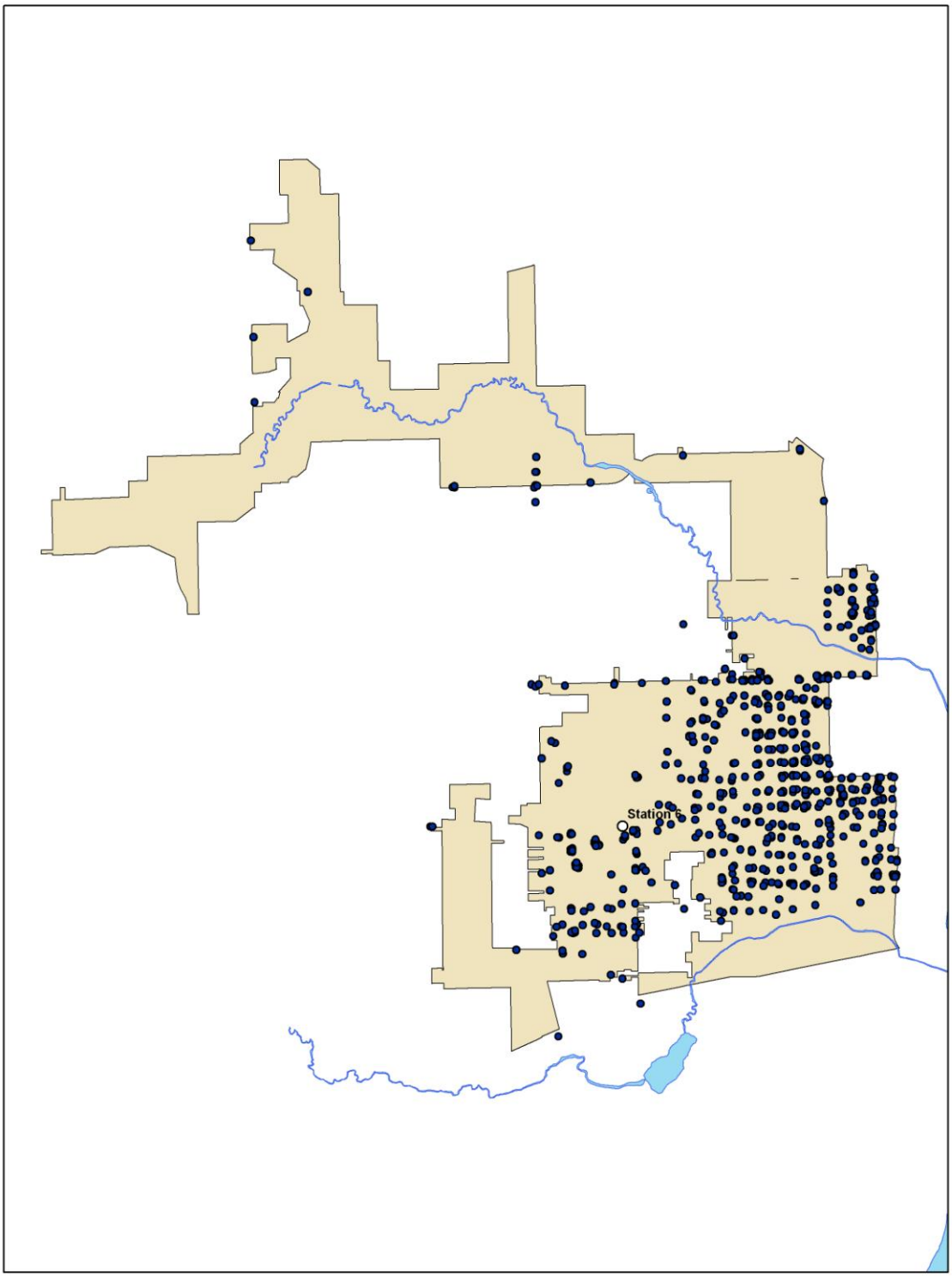
Station #4: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(1106 Incidents)



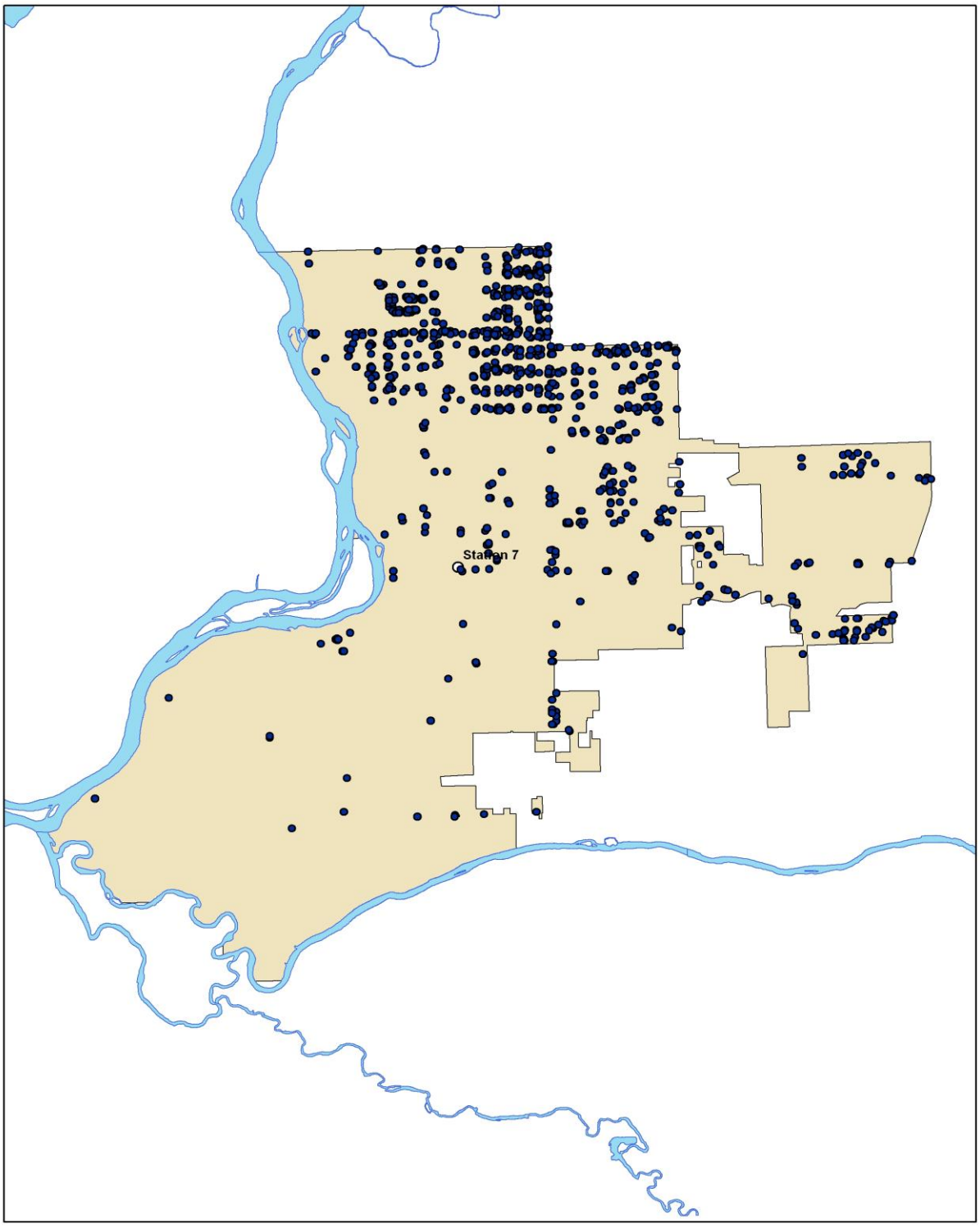
Station #5: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(1548 Incidents)



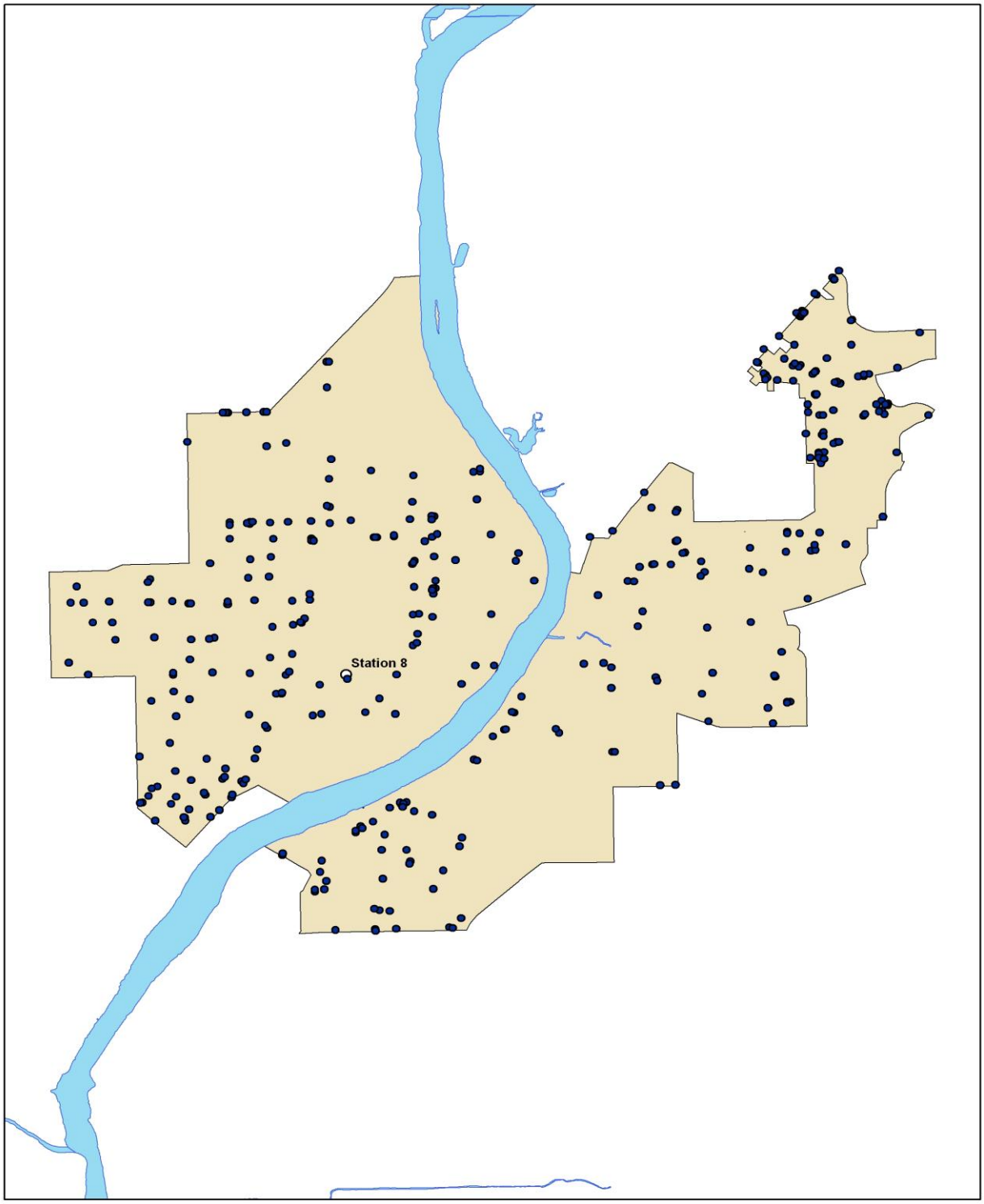
Station #6: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(1025 Incidents)



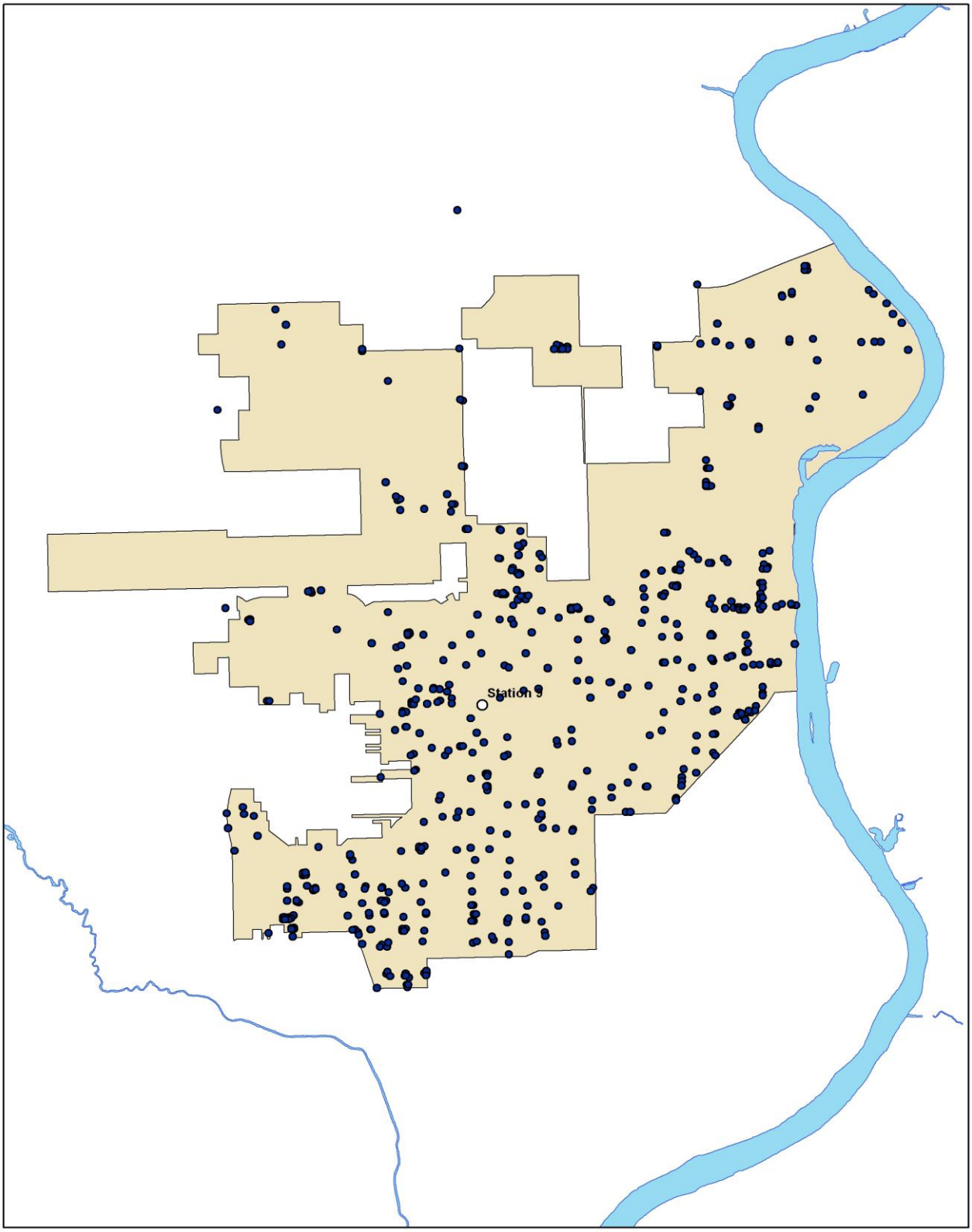
Station #7: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(1780 Incidents)



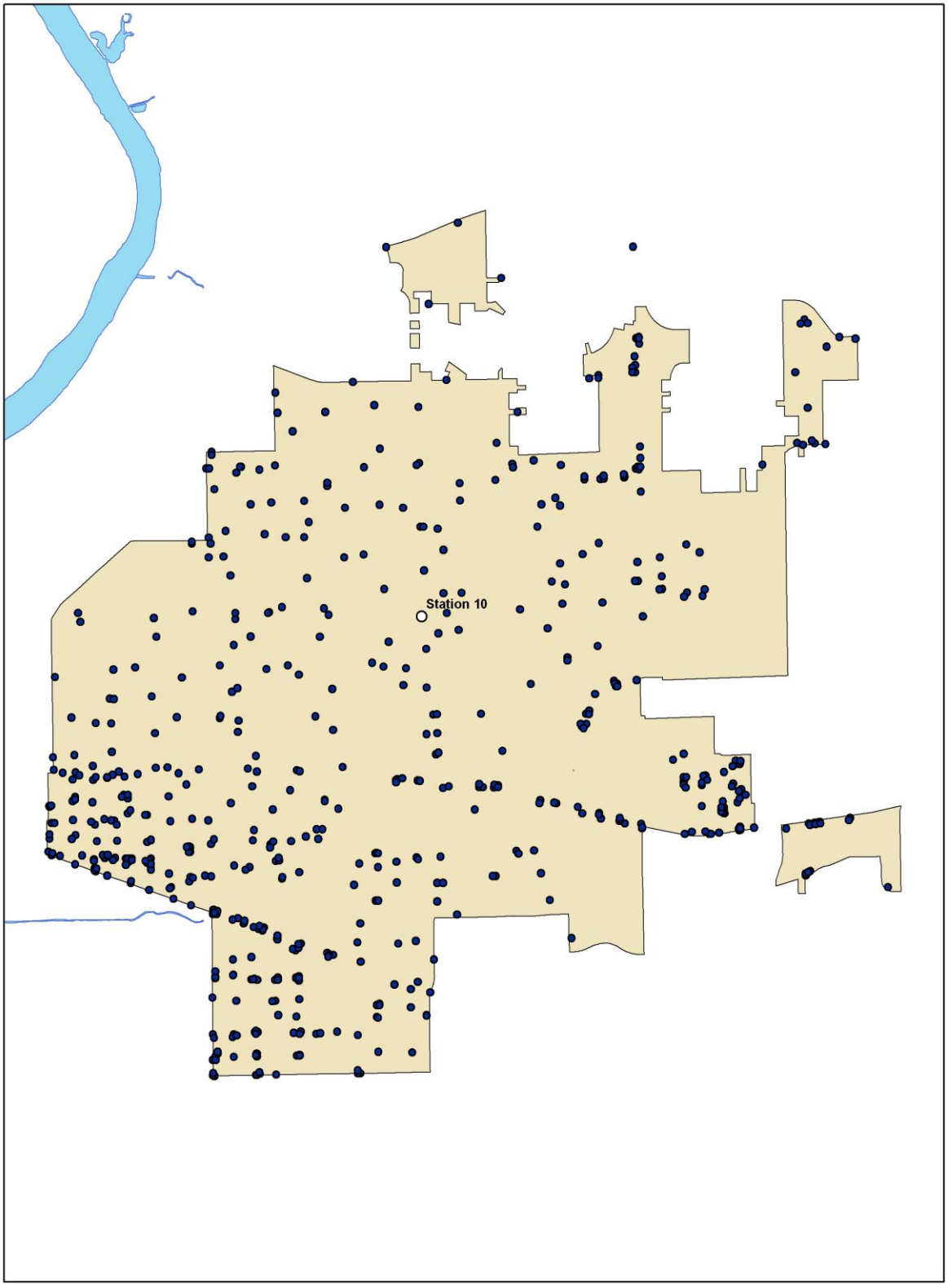
Station #8: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(598 Incidents)



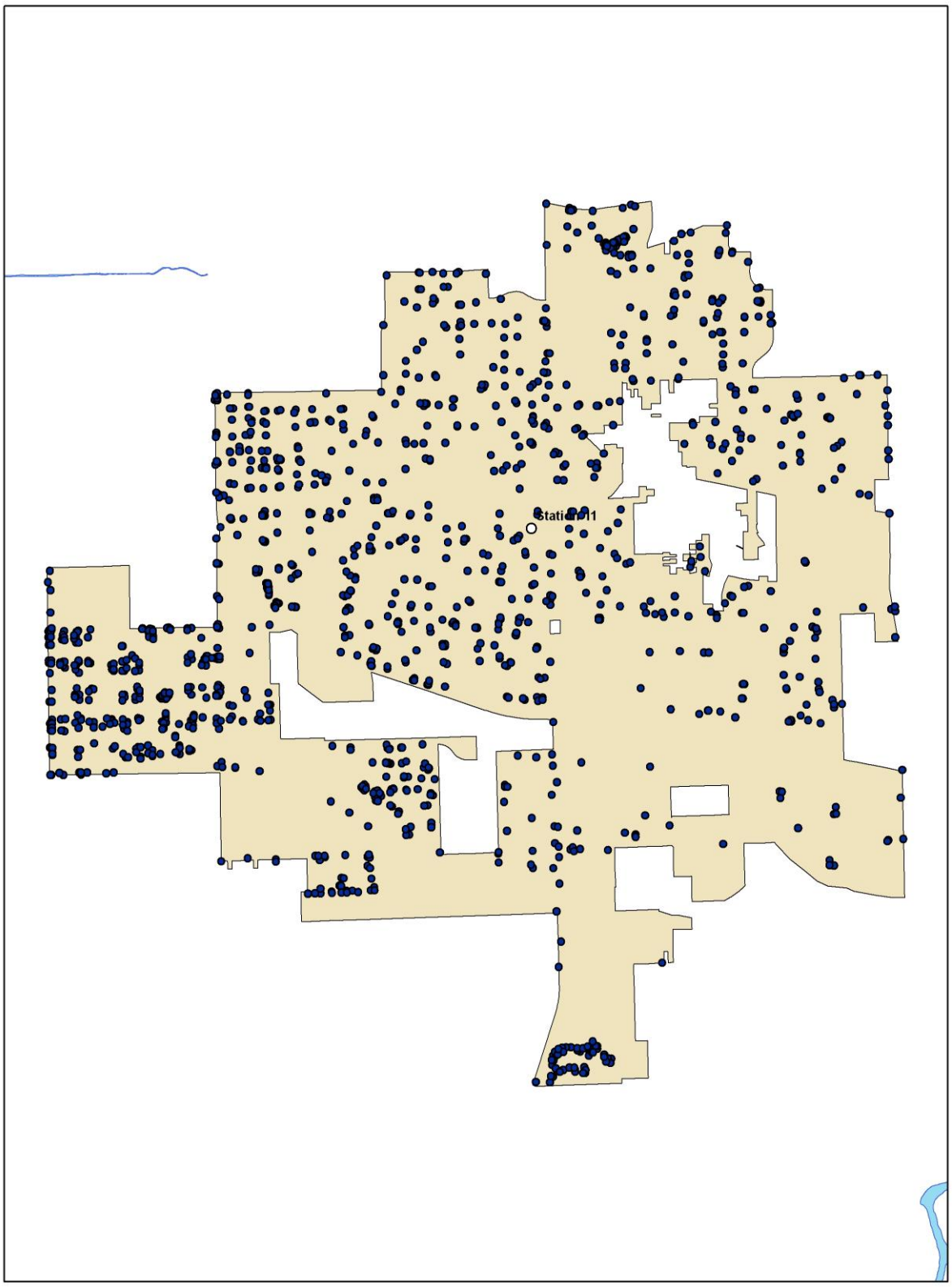
Station #9: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(895 Incidents)



Station #10: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(932 Incidents)



Station #11: Still Territory
EMS: 1st Arriving Unit > 4 minutes
(2142 Incidents)



Ambulance UHU Trigger and Threshold Calculation

As explained in Section Five of the SOC document, Department ambulances are required to complete the associated documentation prior to leaving the receiving hospital and returning to available status. Consequently, an ambulance has a longer incident commitment time than a fire apparatus - which is in service and available for response during documentation and restocking. In order to account for the difference between a fire apparatus and fifty minutes for an ambulance), the Department calculated the relevant UHU factor for ambulances.

To determine a suitable ambulance UHU, the Department started with the hours available for incident response and activity as shown on the *Fire Station Activity Matrix* (page 76) in this document. Since ambulance personnel are required to complete the same station-related duties (training, maintenance, etc.) as fire apparatus personnel, the maximum ten hours per day allotted for incident response and related activities should also be the same.

Working backward from ten hours of station activity per day, and assigning an average of fifty minutes (.833 hrs.) per incident, the maximum incident response for an ambulance is twelve per day at 4380 incidents per year. The Department used the CPSE/CFAI formula for UHU calculation to arrive at the maximum UHU for a Department ambulance:

$$\frac{\text{(incidents) X (time per incident)}}{\text{Hours per year}} = \text{UHU}$$

$$\mathbf{\frac{4380 \text{ X } .833}{8760} = .41 \text{ UHU}}$$

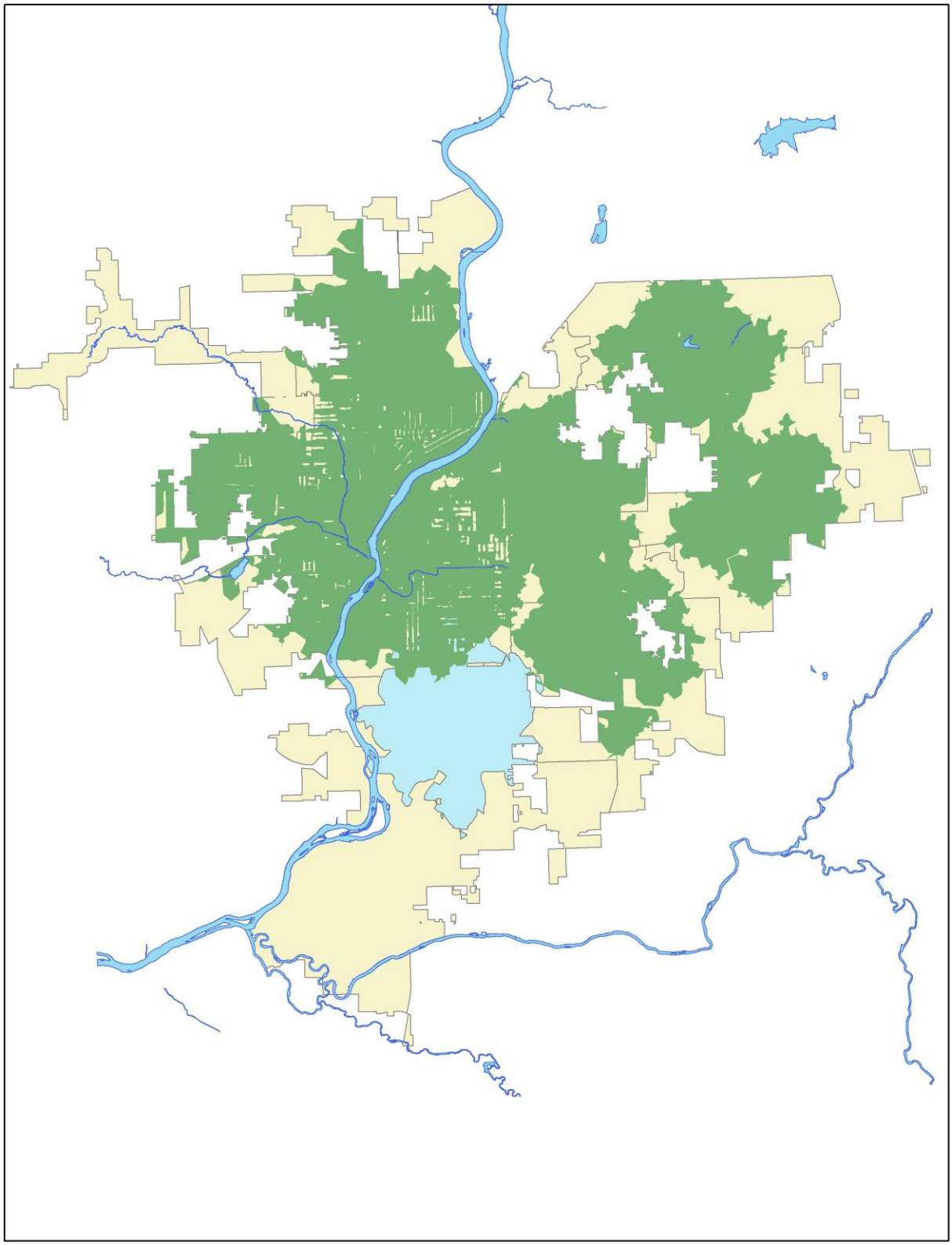
With an established maximum UHU, the Department assigned the same (.05) UHU range to a Department ambulance as CPSE/CFAI assigned to a fire apparatus: .36-.41 UHU. The UHU calculation formula was then used to calculate the incidents at the lower limit of this range:

$$\mathbf{\frac{\text{(incidents) X } .833}{8760} = .36 \text{ UHU}}$$
(3800 incidents)

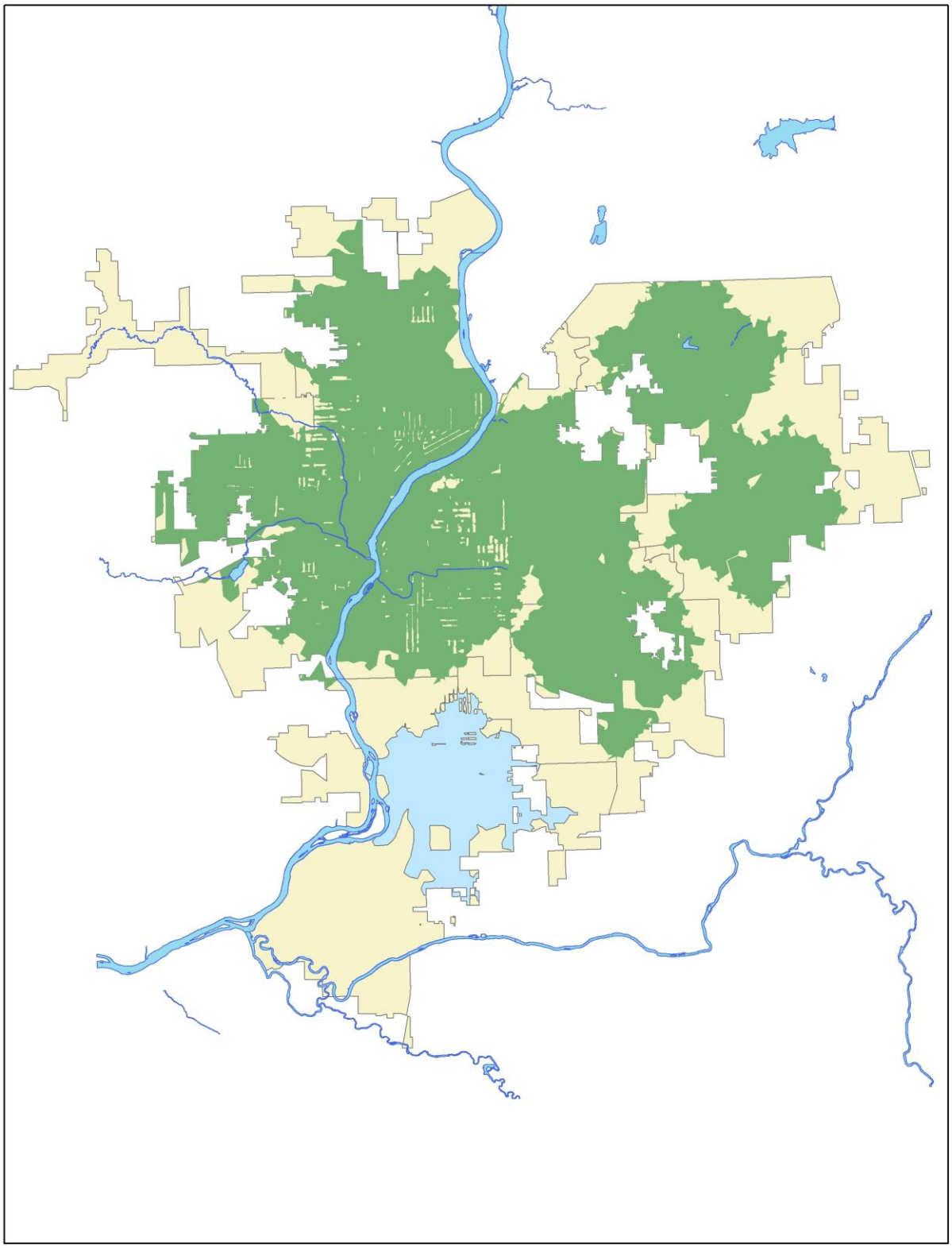
With the maximum UHU range established, the Department again used the CPSE/CFAI differential (.05) to assign a trigger UHU for ambulances at .31 UHU and calculate the number of incidents at that trigger:

$$\mathbf{\frac{\text{(incidents) X } .833}{8760} = .31 \text{ UHU}}$$
(3270 incidents)

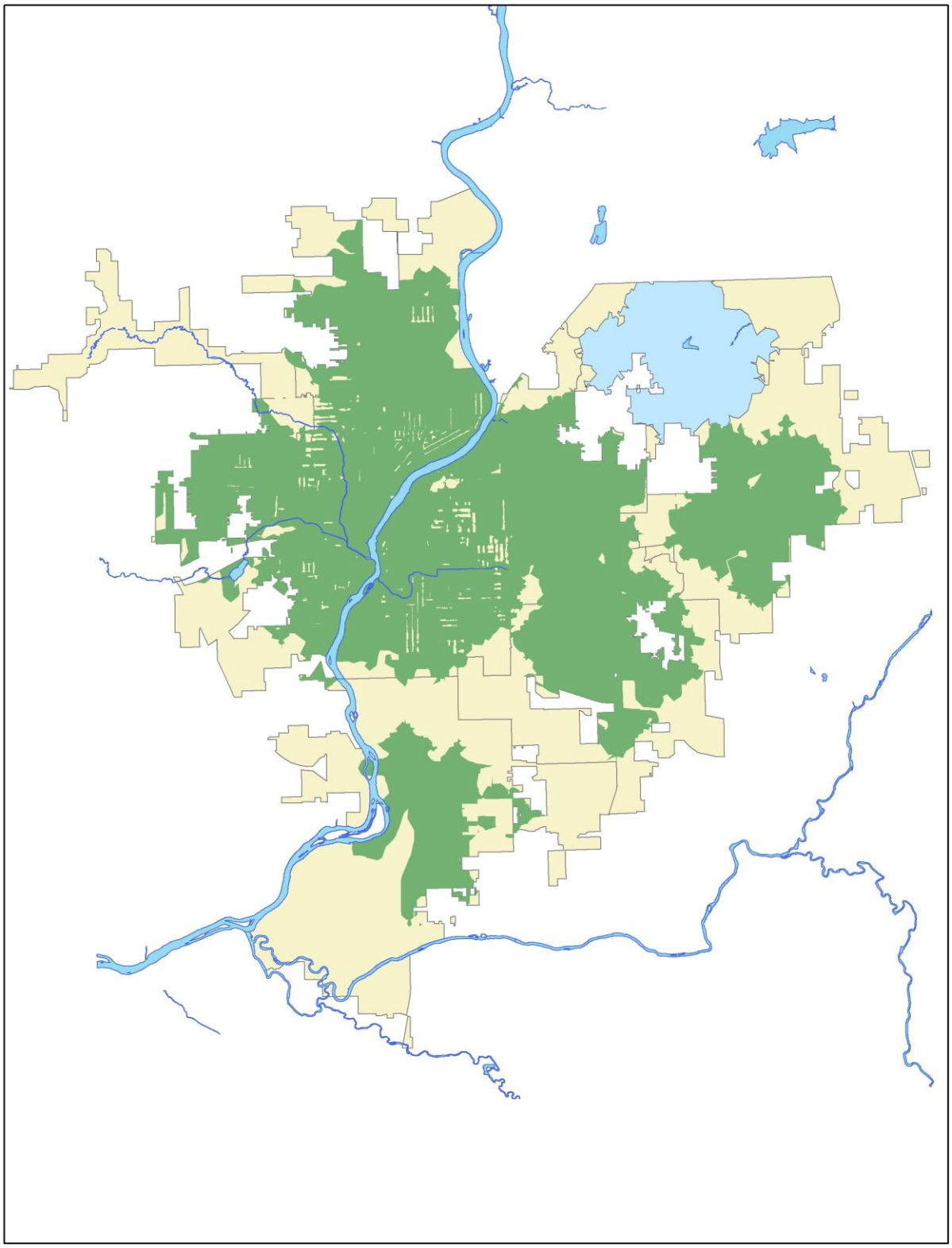
Q7 to Barnum Road and 11th Street



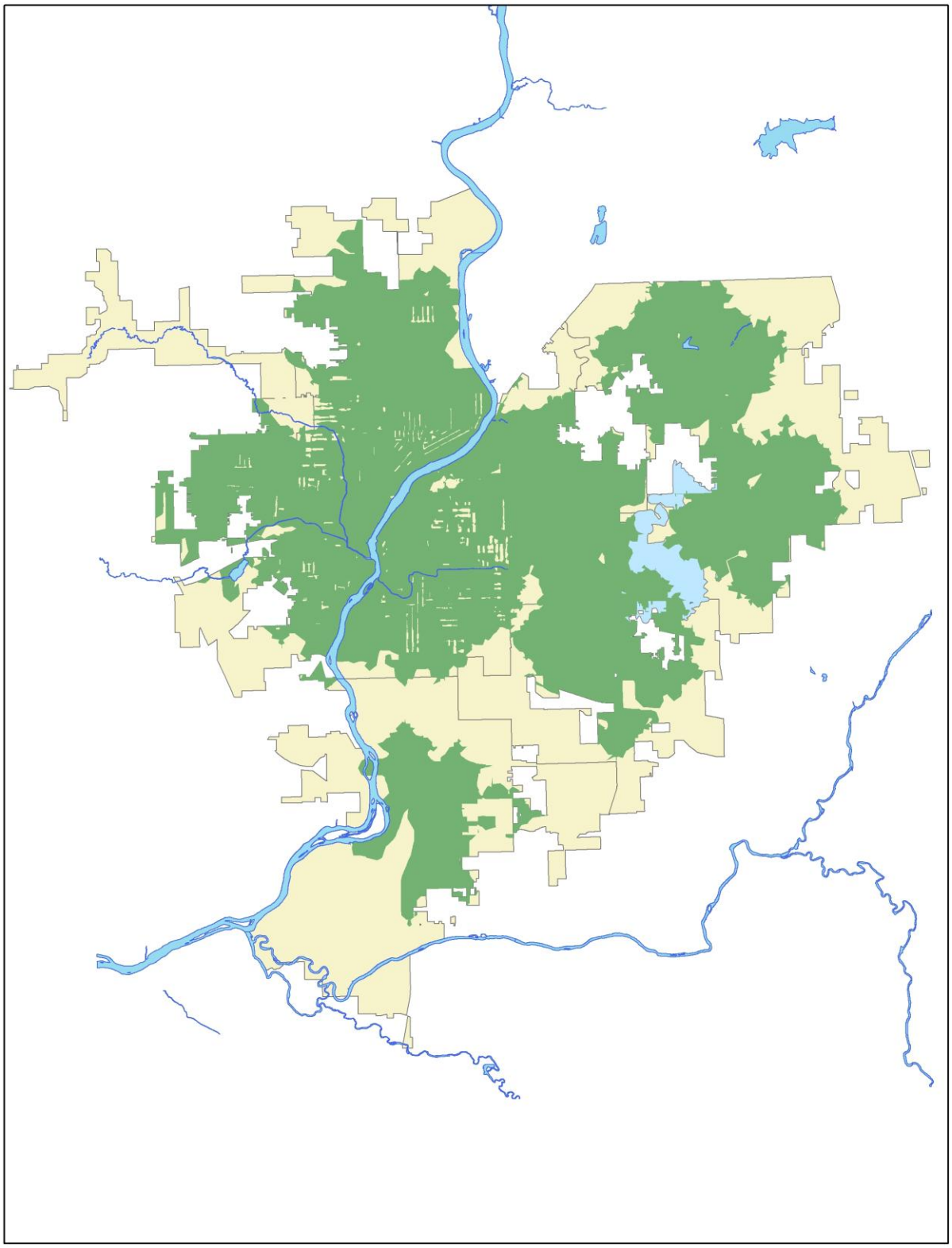
Q7 to Airport Drive and 11th Street



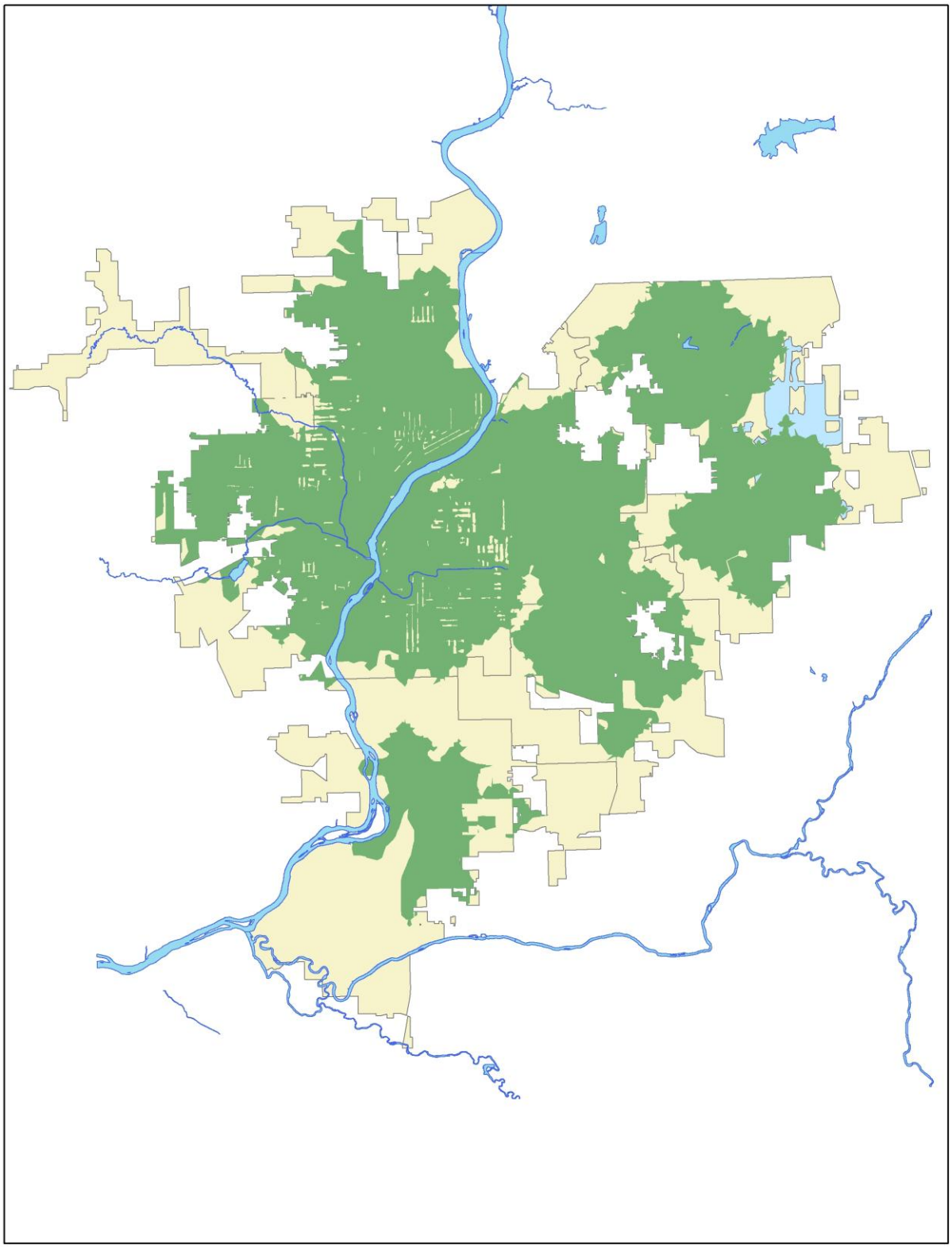
E4 to Applewood Lane and Spring Brook Road



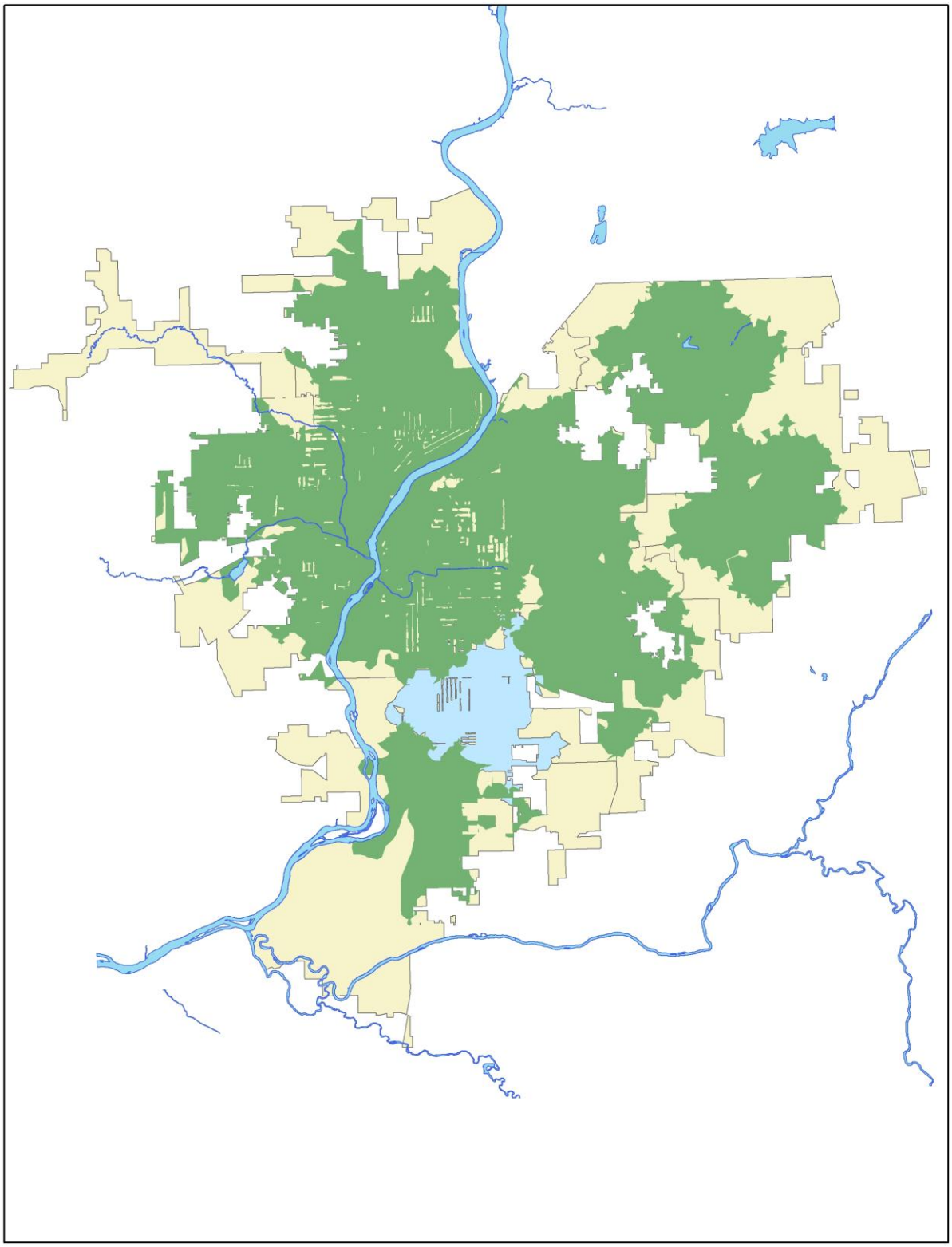
Station #12 at 5000 East State Street



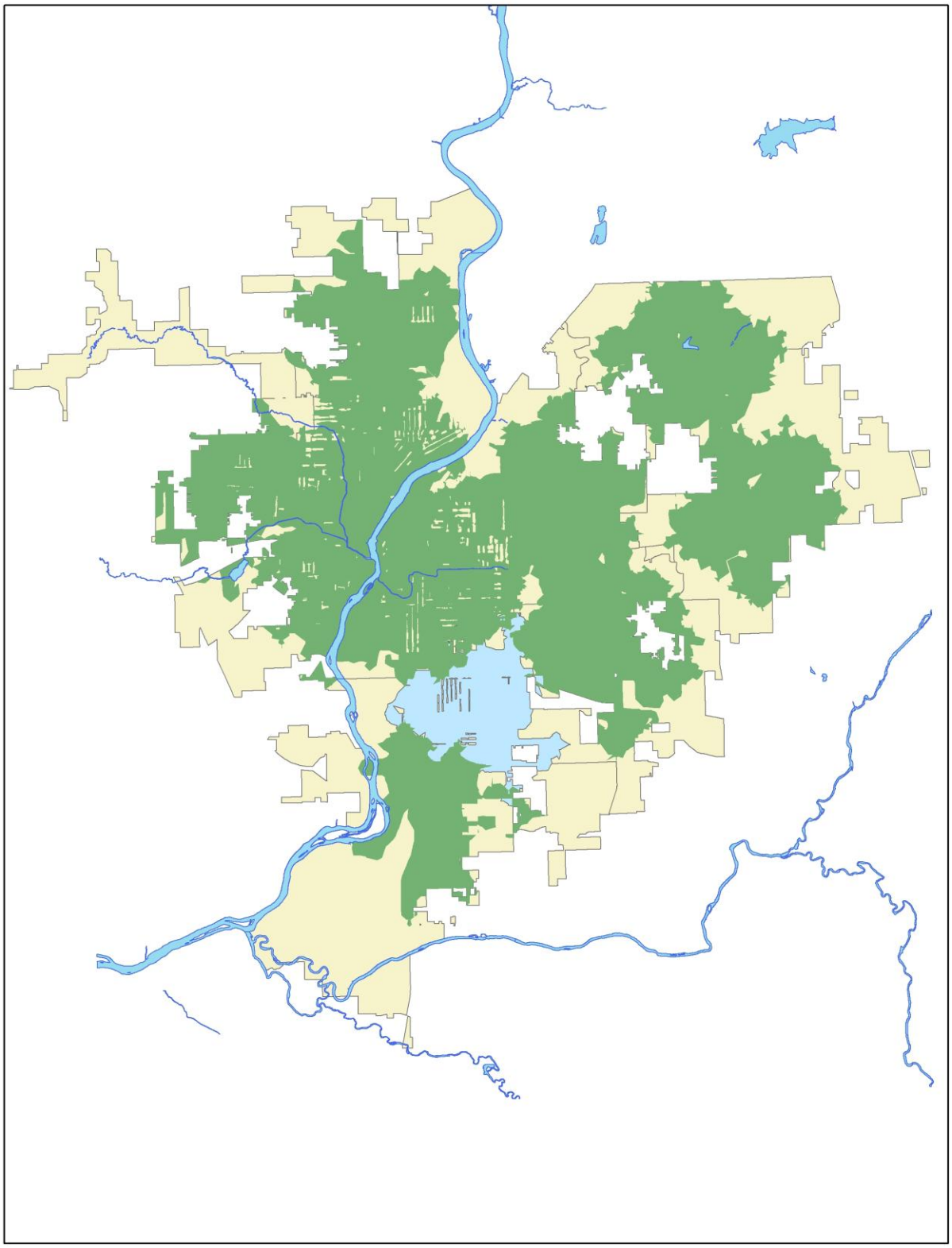
Station #12 at Guilford Road and Perryville Road



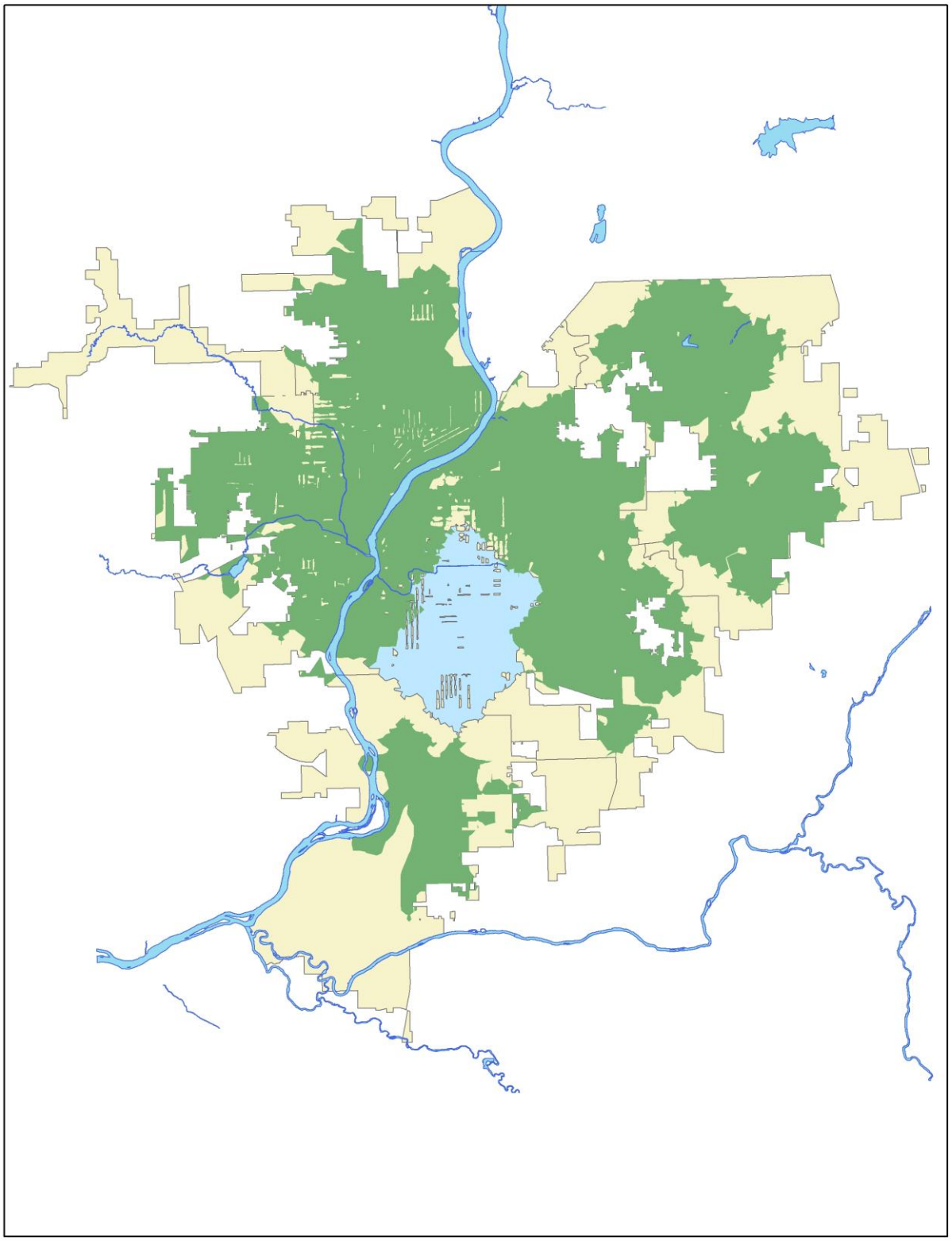
Station #12 at Reed Avenue and 17th Avenue



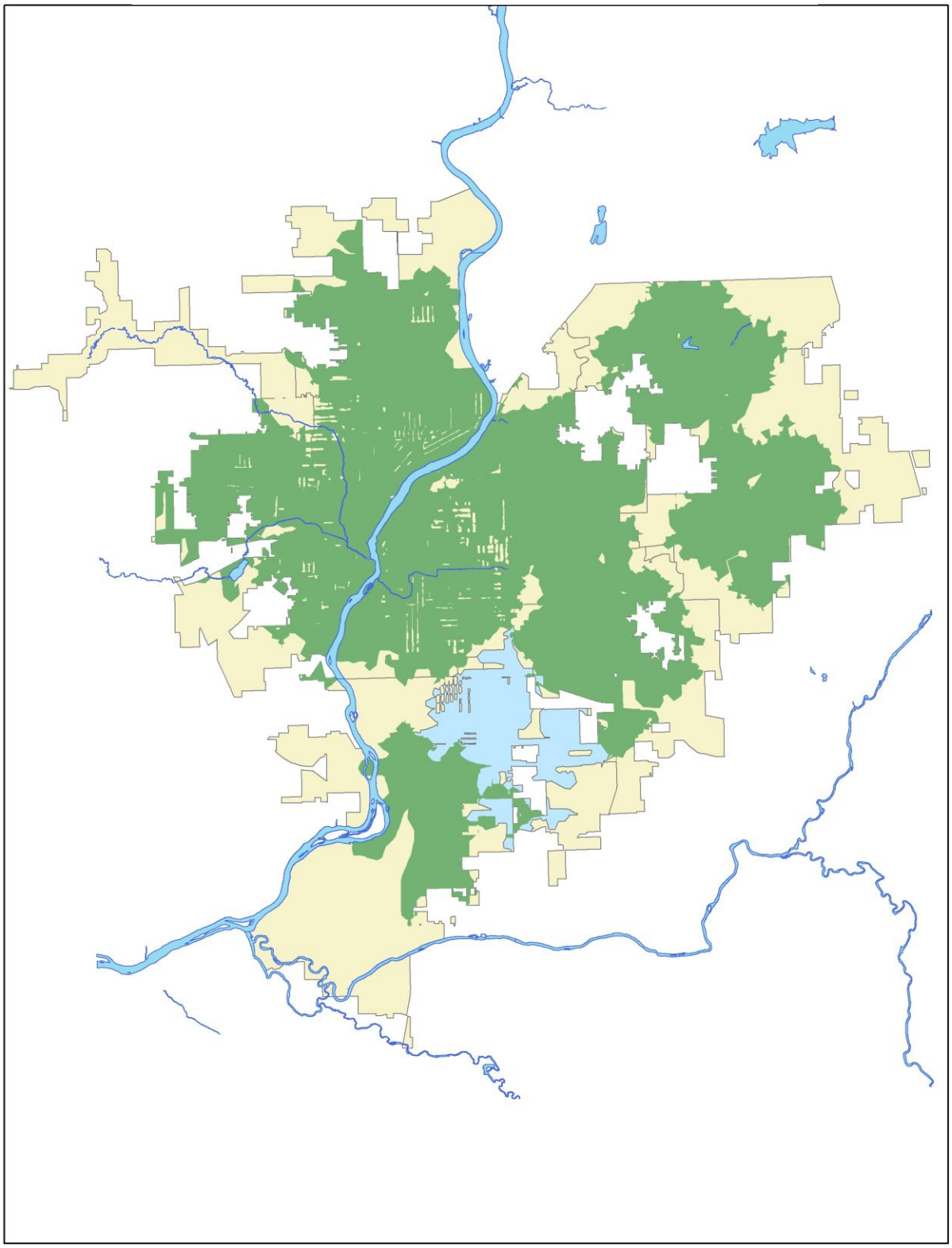
Move Station #8 to Reed Avenue and 17th Avenue Street



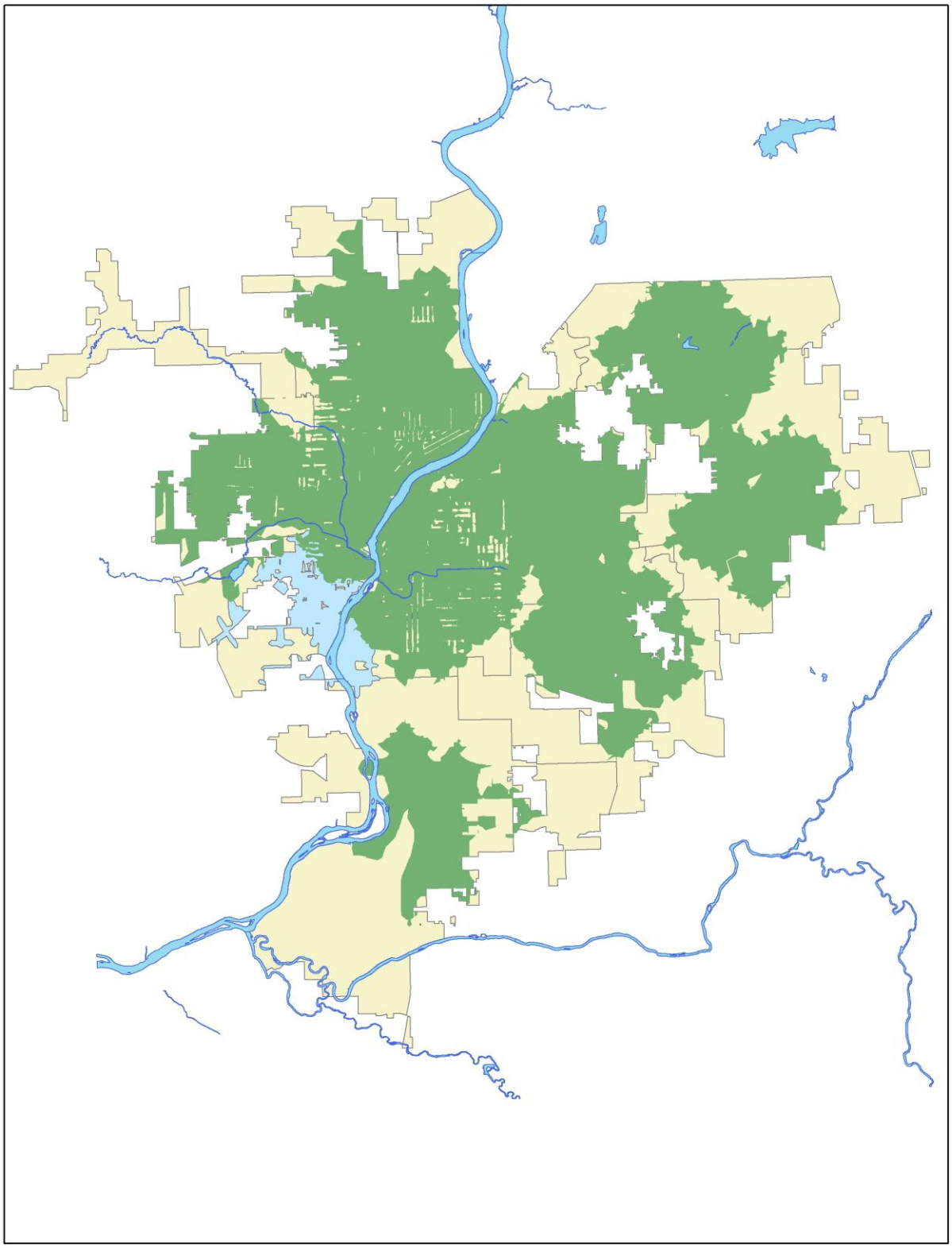
Move Station #2 to 11th Street and 18th Avenue



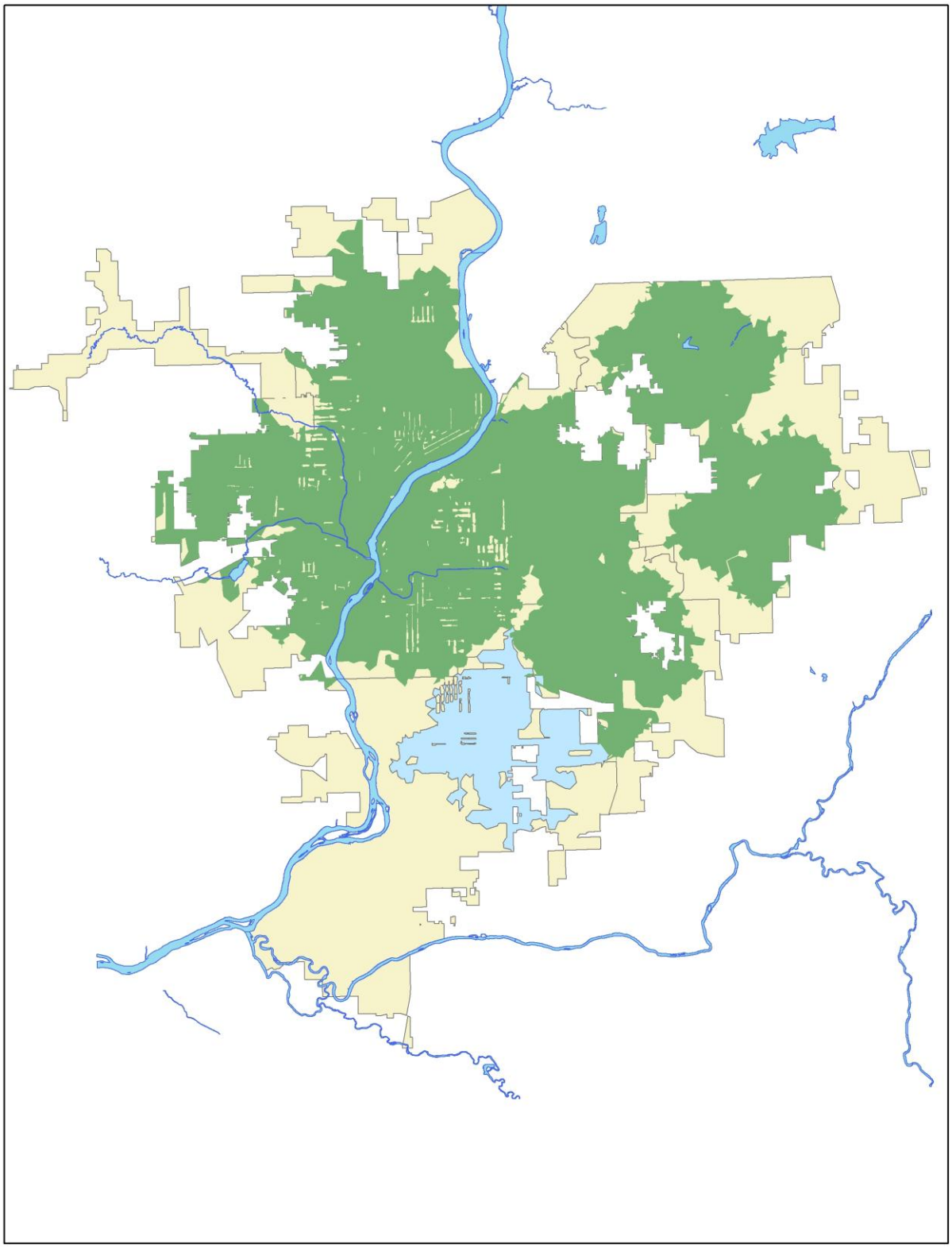
Station #12 at 20th Street and Sandy Hollow Road



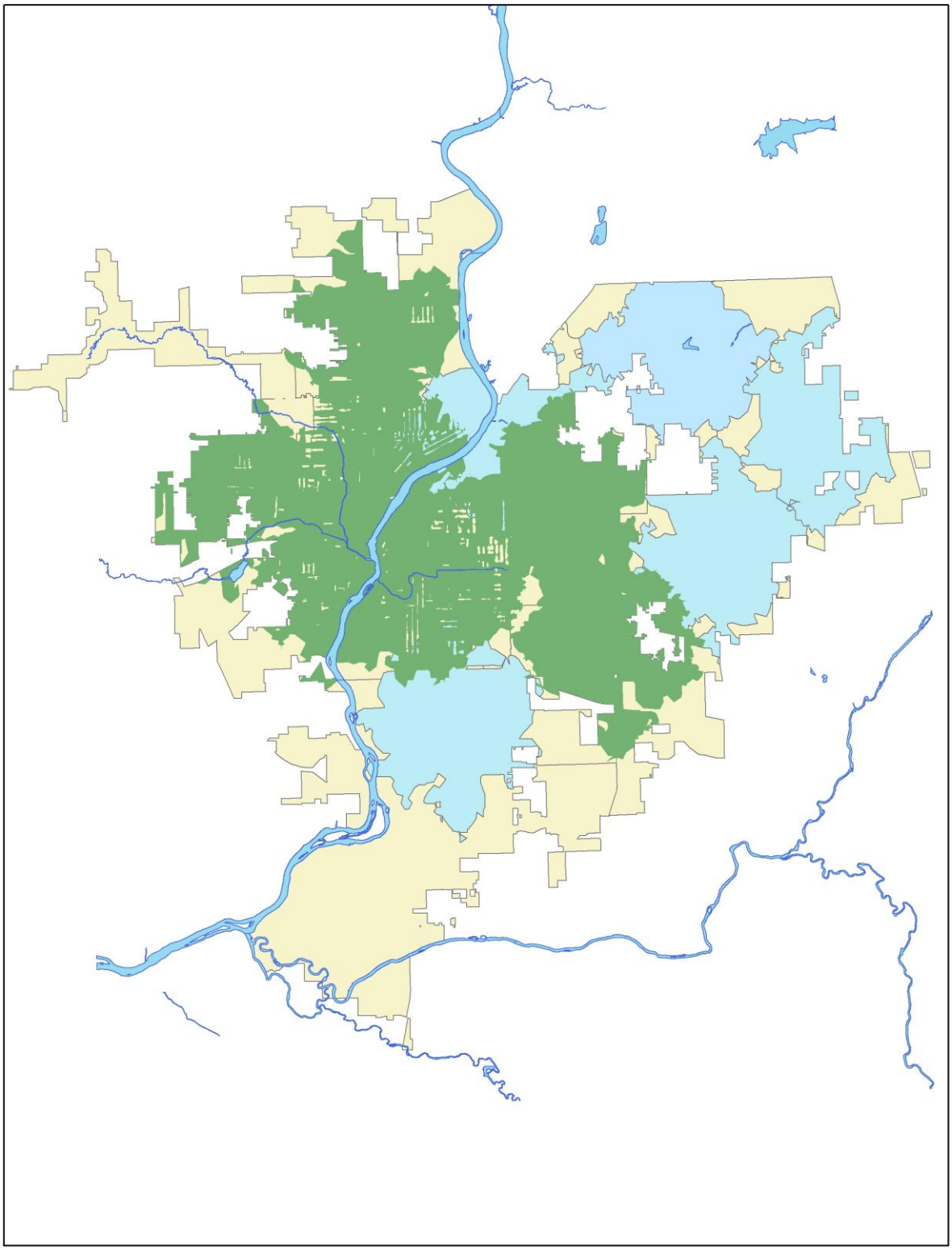
Move Station #3 to Ogilby Road and Clifton Avenue



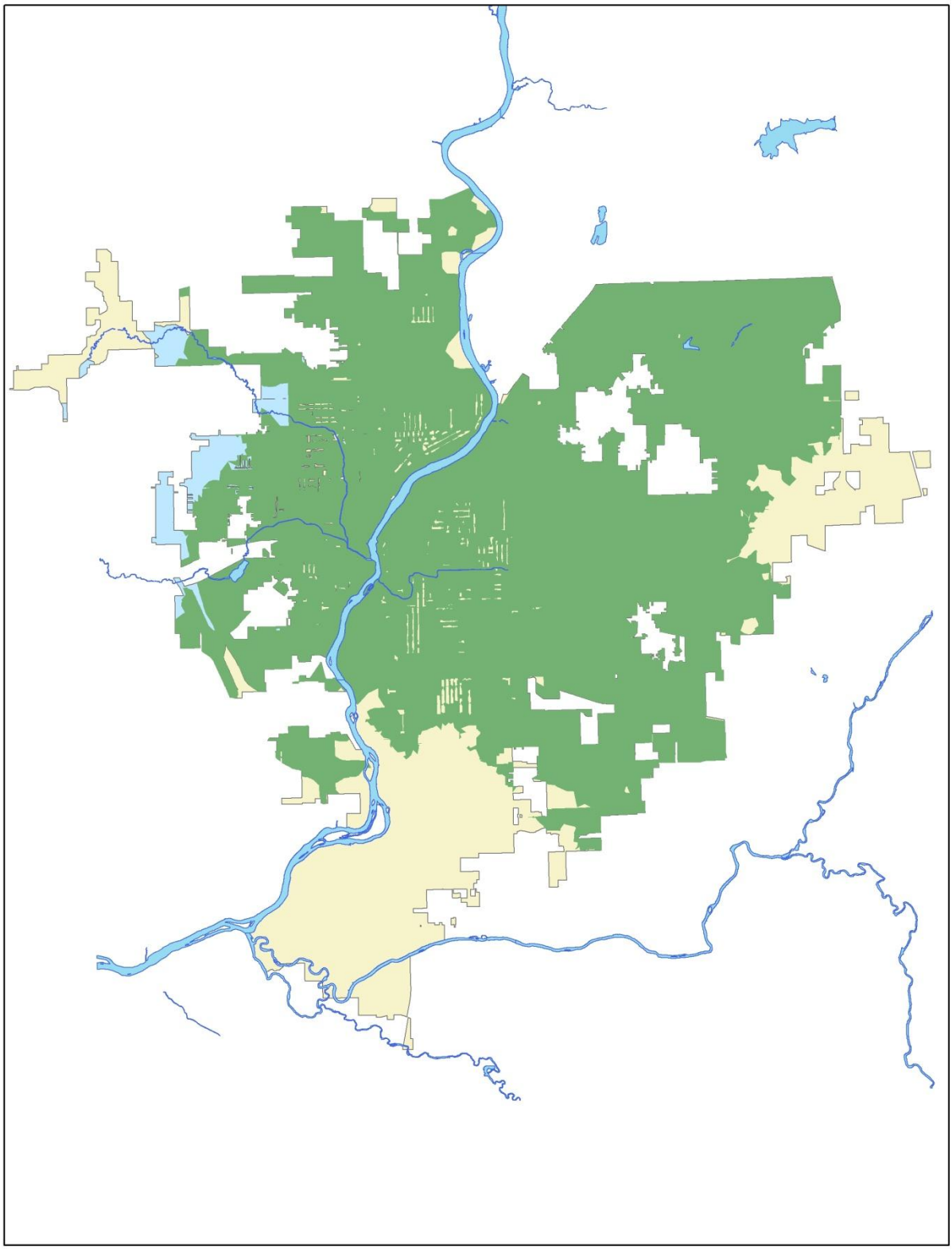
Move Station 7 to 20th Street and Sandy Hollow Road



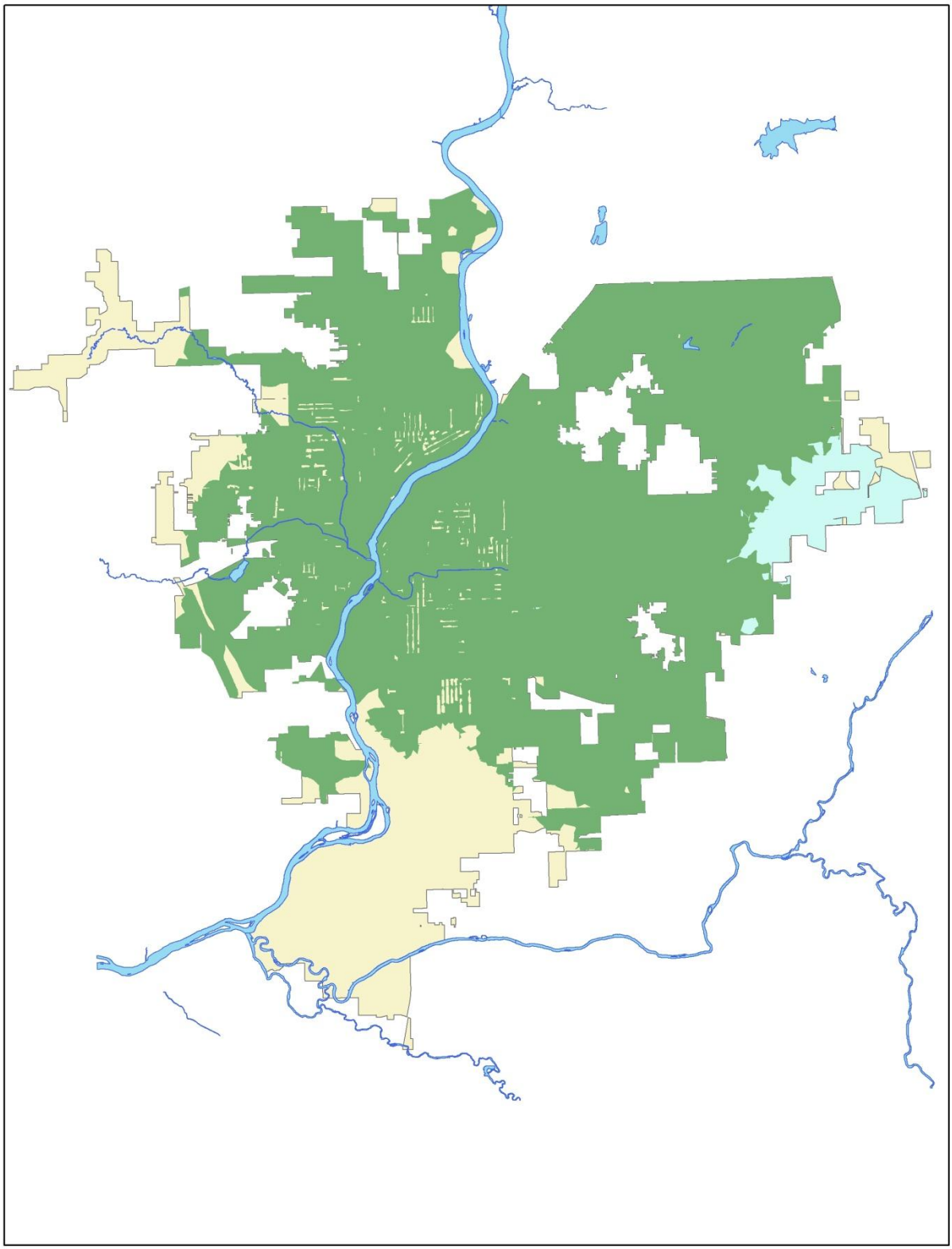
Q7 to Barnum Road and 11th Street + Q5 to Elaine Drive and South Mulford Road + E8 to Spring Creek Road and Parkview Avenue + E4 to Applewood Lane and Spring Brook Road + Station #12 at Bell School Road and Rote Road



6th Ambulance at Station #6



6th Ambulance at South Mulford and Elaine Drive



6th and 7th Ambulances at Station #6 and South Mulford Road and Elaine Drive